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PRIZES FOR NEW IDEAS IN TRACK MAINTENANCE.

It is safe to say that every maintenance engineer, every bridge engineer and every engineer of new construction, whose experience extends over a number of years and over diversified pieces of work, has found especially quick and especially economical ways of performing specific tasks that confront him. Each new edition of a civil engineering pocketbook is sure to include some of these efficient methods of procedure, which bear much the same relation to the work of the young civil engineer engaged in field work that the shop kinks bear to the work of the shop foreman. But we are inclined to believe that the collection of these devices already to be found in engineering pocket-books by no means equals the demand for them. Therefore, the *Railway Age Gazette* takes pleasure in offering prizes for such collections, in the hope of bringing valuable ideas to light. For the best single device or collection of devices applicable to track maintenance, we offer a first prize of $50, and for the next best device or collection of devices for track maintenance we offer a second prize of $25. Manuscripts submitted in competition must reach us not later than February 21. They should be accompanied, if possible, by drawings or photographs, or both, and the description should be brief but clear. The winning collection will be published in one of our daily issues, appearing at the time of the Maintenance of Way Convention in March. Collections which are judged worthy of publication, but are not awarded a prize, will be paid for at our regular space rates.

We believe active engineers, having experience with many different kinds of work under diversified conditions, all over the country, can be of much help to each other if they will give us the opportunity of publishing these specially developed methods of practice. If this first competition turns out well, we shall endeavor to extend it to other branches of railway civil engineering work later on.

The Interstate Commerce Commission, in its annual report, urges that a "physical valuation of the interstate railways of this country" shall be made to be used as a test of the reasonableness of government-made rates. Why a *physical* valuation? In the case of Smith *versus* Ames the federal supreme court said that a railway is entitled to earn "a fair return on the fair value" of its property. Out of that statement has grown the demand for a valuation of railways. But the court said nothing whatever about a *physical* valuation. On the other hand, it did say that in ascertaining the value of the railway's property the original cost of construction, the cost of reproduction, the probable earnings (based, necessarily, on the density and nature of the traffic), the operating expenses and the market value of stocks and bonds must be considered. The purport of this is as plain as a pikestaff. It means that in estimating the "fair value" of the railway, not merely the value of its physical property, but also all other factors of its value as a going concern, excepting, perhaps, its existing schedules of rates, must be considered. It is believed there cannot be found in any decision of the Supreme Court or of any other federal court a single word in support of the crude theory of physical valuation. How it originated and gained its widespread currency is incomprehensible. The commission says that some means should "be furnished by which, within reasonable limits, a value can be established which shall be binding upon the courts and the commission." Those who advocate a valuation generally assume that it would be made by the commission. Does the commission think a valuation made by it on a plan that never has been countenanced, but by plain implication has been repudiated, by the Supreme Court, would be "binding" on it or any other federal court? If a valuation is to be made, let it be so made that it will meet the requirements indicated by the language of the Supreme Court. Otherwise, it would seem, it will be a waste of time and public money.

Secretary Knox has proposed that the railways in Manchuria, most of which are now controlled by Japan and some by Russia, shall be turned over to China. The money necessary to finance this transfer he proposes to have furnished by an international syndicate of bankers. The concessions under which Japan and Russia operate the railways in Manchuria expire within thirty years, and the railways revert to China. Although no sum is mentioned, Secretary Knox's proposal implies that Japan shall be compensated for relinquishing what, from the standpoint of Japanese manufacturers, is probably a very profitable monopoly, but which from the government's standpoint is probably an unprofitable business. By turning the control of the railways of Manchuria over to China it is considered that an important step will be taken in the extension of the general principle of an open door for all nations in the Far East. On its face this proposal appears to ask Japan to relinquish one of the important advantages fought for and gained in the Russo-Japanese war. This view, according to quotations from the Japanese press, is the one that the public of Japan took on the first announcement of the proposal. How far, however, the consideration of adequate compensation being paid Japan will change this attitude, it is impossible to say. Naturally, the attitude of the other powers, Germany and England in particular, is that of friendliness

toward the proposal. Incidentally Secretary Knox, in commenting on his proposal, states definitely the facts of the much-discussed loan to China, which a combination of French, German and English bankers were to make, and which the United States Government asked the other powers interested to permit American bankers to participate in. This request, in principle, at least, has now been agreed to by England, Germany and France and by China, and the loan when made will be participated in by the United States as well as the three other countries. The United States, however, has conceded, in the question of the appointment of chief engineers, that England and the two European countries shall settle this matter between themselves, with the understanding that there shall be American engineers on the various engineering staffs. This loan, it will be remembered, is to be made to China for new railway buildings in that country, and has nothing to do directly with the question of the Manchurian railways.

RAILWAY EARNINGS IN NOVEMBER.

Taking at random the returns of 12 roads operating in widely separated parts of the country, it appears that the month of November, 1909, marks a definite advance over the prosperity of 1907. The aggregate operating income in November, 1909, of the 12 roads* selected was $69,180,649. This is an increase over the earnings of these same roads in November, 1908, of $9,936,027, or 14.4 per cent. Every road in the list—and it must be remembered that the 12 were selected entirely at random—has greater gross earnings in 1909 than in 1908. We might expect to find even greater proportional increases in the expenses, because in November, 1908, the roads in general were still making a determined effort to cut down operating expenses to the lowest figure, which would not, on the face of it, be absurdly inadequate.

The figures, however, for November, 1909, do not bear this assumption out. The net operating income, after payment of taxes, for the 12 roads selected, was $25,749,387 in 1909, and the net increase over the corresponding month of 1908 was $3,315,282, or nearly 13 per cent. Of the 12 roads, only two show smaller net operating income in 1909 than in 1908, and of the 12, seven have a lower operating ratio in 1909 than in 1908 and five a higher operating ratio. The general trend toward greater and greater prosperity is shown by the fact that only two out of the dozen roads had smaller net in 1909 than in 1908, and only two had smaller net in 1908 than in 1907. November in 1907 was for the majority of roads a month of very heavy traffic and correspondingly great gross earnings. The increased net in November, 1908, was due to a greater proportional decrease in expenses than in earnings, and the still greater increased net in November, 1909, shows clearly that the roads are profiting by and still practice the economical operation achieved in the lean year 1908.

Operating ratio, while not being of much value by itself in comparing the operations of different roads with each other, is of great value in comparing the operations of one road with itself in previous years. The following table gives the operating ratio in November, 1908, and November, 1909, for the 12 roads whose gross and net earnings we have been comparing:

	—November—	
	1909.	1908.
Atchison, Topeka & Santa Fe	65.5	60.9
Chesapeake & Ohio	62.0	66.8
Chicago & North Western	72.4	66.8
Delaware, Lackawanna & Western	52.9	50.3
Erie	62.6	74.2
Great Northern	53.5	48.3
Lehigh Valley	58.5	66.8
Missouri, Kansas & Texas	81.0	76.4
New York, New Haven & Hartford	66.2	73.8
Pennsylvania Railroad	63.6	68.0
Southern Pacific—Pacific System	55.2	57.8
Southern Railway	68.2	70.2

*Atchison, Topeka & Santa Fe, Chesapeake & Ohio, Chicago & North Western; Delaware, Lackawanna & Western; Erie, Great Northern, Lehigh Valley; Missouri, Kansas & Texas; New York, New Haven & Hartford; Pennsylvania Railroad, Southern Pacific—Pacific System, Southern Railway.

MAKING SAFETY LAWS AND ENFORCING THEM.

President Taft includes the pending safety appliance law among the proposals of the Interstate Commerce Commission that he endorses unreservedly in his special message of January 7; and we print in another column a letter from a prominent railway mechanical officer condemning that law as unnecessary. As the ostensible purpose of this bill is to promote the universal adoption of the standards of the Master Car Builders' Association, it would seem the part of wisdom to try to have the bill amended into a more reasonable form instead of denouncing it on the sole basis of the success that has attended the work of the Master Car Builders' Association in the past. The president has been told, no doubt, that the master car builders have progressed as far as it is possible for them to go, and that now the government must take hold. It is true that in most things connected with safety appliances the commission hitherto has refrained from setting up standards not approved by the association; but the trouble with the proposed law is that it will tend to prevent the association itself from making further progress. Under it the commission can take the standards of to-day and make them the inflexible requirements for all time. The association, on the other hand, can revise and improve, year by year, and thus keep its standards abreast of the best practice, as developed under changing conditions; but to get revisions or improvement measures through Congress is likely to be a hopeless undertaking. Such success as the government has had in regulating freight car details in the past has been due to the care which it has taken to demand no more than the best managed roads could reasonably grant. In other words, the government has not devised methods or designed structures, but has regulated and supervised. If, in this matter of grab-irons, running boards and ladders, the commission were authorized to hold the roads up to the standards of their own association it might be performing a useful function, for those standards would always represent the latest fruits of the combined wisdom of the best car specialists of the country. In the matter of hand-brakes so applied as to work in opposition to the air-brakes, the commission would do well to publish at once the names of the roads that have been found perpetuating this very dangerous practice. It is so universally condemned that it is hard to believe that "a great many" such has been found, or that a statute is necessary to cure the evil.

From another letter which we have received it appears that in many cases those railway officers who, like "X. Y, Z," object to the regulating activities of the commission, have in mind not so much the requirements of the law as the way in which they are carried out. They intimate that the inspectors are prejudiced or inefficient. The terms of the present safety appliance acts are quite plain, however, and if an inspector varies from them in the slightest degree it ought to be easy to call him to account without delay. Likewise an inspector who exercises himself to promote the supposed interest of a labor union instead of attending to his proper duties should be denounced in unmistakable terms.

The one safety law proposal that is approved by everybody—that for the investigation of train accidents—is conspicuous in the president's message by its absence. A law of this kind, properly administered, would tend to save lives by the score, whereas the grab-iron law only aims to add a refinement to safety measures that are in a good degree efficient already. We yield to no one in consideration for the brakeman in his dangerous duties, but we love the passenger also, especially when he happens to be a personal friend riding in the rear car on a road poorly signaled. There is only one if about the accident-investigation bill; its whole value depends on the appointment of competent, impartial investigating agents. Railway officers are at one with the public in desiring to have the lessons of accidents made available for all, as witness the action of the Union Pacific in asking outsiders to take

part in the investigation of collisions and derailments. But what kind of investigators would the commission appoint? The British army officers who conduct inspections for the Board of Trade are not always very wise, and their recommendations, in obscure cases, sometimes miss the mark entirely. But their findings are always above any suspicion of influence. If an engineman overruns his signal the blame is not put on the air-brakes. The traditions of British railway service, however, are traditions of carefulness; ours are traditions of chance-taking, and the difference is fundamental.

Investigators of railway accidents in this country detailed from the army would not be as shrewd in their guesses as ex-division superintendents, but guessing is not always necessary; the facts of an accident are apt to be fairly plain, and expert railway testimony is always to be had. With the facts at hand the army colonel would not care for the opinion of organized labor, or of organized capital, or of the Interstate Commerce Commission, or of Congress itself, but would tell the truth, and tell it plainly. Are we so sure about the ex-division superintendent? One inspector would have behind him the training of exact obedience to orders; the other, the habit of compromise with men and methods, and a long list of humiliating experiences where the men he should have discharged *before* the accident happened were protected by the brotherhood.

PER DIEM RATE UNCHANGED.

The American Railway Association by a letter ballot which was ordered previous to the Chicago meeting in November, has voted on a proposal to raise the rate per day for borrowed freight cars to 30 cents, and also on one to make the rate 35 cents and another 40 cents; but all three have been defeated. This leaves in force the present rate of 25 cents, and the whole per diem matter in the rather unsatisfactory and unsettled state that it has been in ever since the present rate was adopted, following the great increase of idle cars caused by the panic of 1907 and the subsequent business depression. The letter ballot again makes prominent the wide difference of opinion between the officers of what have been called the "originating" and those of the "distributing" roads. The originating roads are mainly those between the Missouri river and the Atlantic ocean and north of the Ohio river. The distributing roads include those west of the Missouri river, the New England lines and those in the South. The conflicting opinions and interests of these two classes of railways manifested themselves in the Commission on Interchange of Freight cars* and caused majority and minority reports to be submitted; and the same conflict of opinion and interests caused a quiet but earnest campaign to be conducted for and against the adoption of the 30, 35 and 40 cent rates, the originating roads favoring the 40-cent rate and the distributing roads favoring the 30-cent rate; but not enough roads favored any rate to secure its adoption, a two-thirds vote (measured by cars owned) being required.

The position of the originating roads was that 40 cents a day was no more than a reasonable compensation for the use of a car, based on the actual cost incurred by the owning railway in owning it, with a fair percentage added. The interchange commission made two estimates of the cost of owning a freight car. One was based on the costs of repairs, replacements, etc., for the six-year period, 1902 to 1907, inclusive, and the other was based on the similar costs for the single year 1907. The total estimated cost, based on the figures for the six-year period, was 34.42 cents a day, less 2.5 cents allowed for repairs borne by the borrower, leaving the net cost per day 31.92 cents. The estimated cost of ownership, based on the figures for 1907, was 40.53 cents, less 2½ cents allowed for repairs borne by the borrower, leaving the net cost per day 38.03 cents.

Those who opposed the 40-cent rate contended that the figures for 1907 were not a proper basis because the labor and material costs for that year were the highest ever known; the average cost for the years 1902 to 1907, inclusive, would more nearly represent normal conditions. Based on these latter figures it was contended that a rate of 35 cents a day would more than cover the cost of repairs, replacements, taxes and interest at nearly 8 per cent. on the investment in the car. Of course, the profit derived by the owning roads from the higher rate of 40 cents would have been still greater. A statement was prepared to show that 16 of the leading railway systems, having 874,154 freight cars, or about 40 per cent. of all in the United States, would receive as profit after allowing 5 per cent. interest on the investment nearly $20,000,000 on the 35-cent rate and nearly $36,000,000 on the 40-cent rate; and on the 30-cent rate $3,811,014.

In addition to the fact that, as was contended, the 35-cent or 40-cent rate would be so far above the cost as to yield to the owner roads' excessive profits, it was argued, that their imposition throughout the year would be illogical and unjust both to the roads and the public, as while there is ordinarily a car shortage for about four months in the year, there is ordinarily a car surplus for the other eight months. A high per diem rate is beneficial during one-third of the year when there is a shortage of cars, because it tends to expedite their movement; but it is harmful during the eight months of the year when there is a surplus, because it tends to increase the useless hauling of empty cars home when they might as well stay where they are.

If the distributing roads could freely transfer freight from the cars of the originating roads to their own cars they would be able, of course, to avoid paying the per diem charges. But aside from the cost of reloading, many shippers will not put up with it because of the delay, and also in many cases because of damage. And as a high per diem rate in times of car surplus affords a strong incentive to the originating roads to use to as great an extent as possible their own cars and to send the cars of other roads home empty, the originating roads at such times have a great advantage.

The remedy proposed by Mr. Kruttschnitt and some others was the adoption of a variable per diem rate. Under this plan the rate during times of car shortage would be high, perhaps 40 or 50 cents. Some proper authority representing the American Railway Association would be given power to reduce it to perhaps 30 cents when the car shortage had disappeared or was on the point of disappearing. When the car surplus exceeded the car shortage the rate would be still further reduced. This method would be analagous to that followed in many markets in fixing the rate of interest, or by the Bank of England in fixing the rate of discount. When there is a shortage of loanable capital the banks impose a maximum rate; and as the demand for capital declines the rate of interest is reduced. A variable per diem rate would have a similar effect on the car supply. When the available supply of cars greatly exceeds the demand, the rate should be so reduced that each road would have substantially no more incentive to select its own cars for loading to connecting lines than to select for loading the cars of other roads. By depriving the roads of the incentive to load their own cars rather than those of other roads, the empty mileage would be kept at the minimum, and a free and normal circulation of cars would be secured at all times.

For the time being the "distributors" have won their point; that is, they have kept the rate down. But if, or whenever,

*A special committee appointed in the spring of 1908 to study the whole subject of freight car interchange. It consists of James McCrea, president, Pennsylvania Railroad; Lucius Tuttle, Boston & Maine; W. W. Finley, Southern; Howard Elliott, Northern Pacific; J. Kruttschnitt, Union and Southern Pacific Systems. At the November meeting an elaborate report was presented discussing at length the cost of freight-car construction, maintenance and operation, and recommending that the interchange rate should be 40 cents a day. It was on the basis of this report that the rates proposed in the letter ballot were adopted by the Executive Committee. Two members of the Commission dissented—Mr. Tuttle recommending 35 cents, and Mr. Kruttschnitt 30 cents: hence the three propositions.

business increases so as to make cars generally worth two or three times as much per day as they are now, as occurred in the busy times of 1906, there will have to be another adjustment. If there is not the big lenders will do as they did then —agree among themselves to charge a higher rate. In the meantime Mr. Kruttschnitt, who appreciates the advantages of a freight car pool, is doing valuable missionary work, and his arguments will prove effective as educators in the direction of pooling. He is in the best possible position to act as an apostle of the doctrine of country-wide pooling, because the railways under his own charge cover a territory equal to an empire, and he can speak from experience.

PRESIDENT TAFT'S RECOMMENDATION FOR RAILWAY RATE REGULATION.

It is natural that railway officers should oppose further federal legislation for the regulation of railways. Almost every additional law affecting railways increases governmental authority over and interference with their management, and thereby necessarily restricts the fast narrowing discretion, and increases the duties and difficulties, without at all decreasing the responsibilities, of their executives. For this general reason railway officers are not apt to welcome most of the recommendations affecting railways made by President Taft in his recent message regarding railways and trusts. But even those who look upon Mr. Taft's recommendations with the least favor will be able to console themselves with the reflection that they are much less radical and objectionable than many of the proposals for additional federal railway legislation which are pending in Congress.

(1) Mr. Taft recommends the creation of a United States Court of Commerce composed of five judges, to which all appeals should be made from decisions of the Interstate Commerce Commission. The results of the creation of such a court would depend greatly on its personnel. It may be safely assumed that President Taft would appoint to it men of the same high order of ability and character as generally occupy the federal branch. Such a court would have great advantages over any existing public body for passing intelligently and fairly on cases involving railway rates. It would have the legal knowledge and the entire impartiality that usually charactize the courts; and its members would get by experience the expert knowledge of railway affairs that is acquired from constantly studying and dealing with those affairs by the abler railway commissioners, such as Messrs. Knapp and Prouty. There is great need that the various cases involving railway rates shall be decided promptly, intelligently, and especially on consistent principles, so that both railway managers and the commission shall be left in the least practicable doubt as to what the law is under which they must work. This need would be better met by having all rate cases decided by a Court of Commerce than it is by having them decided by the various circuit courts.

(2) There can be no rational objection to the President's recommendation that the Sherman anti-trust law be so amended as to let railways enter into reasonable agreements regarding rates. Its adoption would merely be legalizing what is now done constantly and with the knowledge and approval of the commission in order to enable it satisfactorily to administer the Interstate Commerce act. Since the commission has been given power to reduce unreasonable rates, to assume that railways by agreements could make and maintain unreasonable rates is to assume that the commission is either unfit for or faithless to its duty.

(3) Under the present law the published rate is the only legal rate. There has been much complaint from shippers because the roads have sometimes mistakenly quoted them rates less than the legal ones, and after sales and shipments have been made on the basis of the rate quoted, the shipper has been forced to pay the higher rate, thereby sustaining loss. It has been objected to the proposition that the roads should be required to quote rates in writing on request, and then protect the rates quoted, that its adoption would open wide the door to unlawful collusion and rebating. As a substitute for this plan, Mr. Taft recommends that in case of misquotation the shipper be required to pay the legal rate, as now, and that the road be fined $250 for its mistake. This plan is not open to the objection that it would open the door to rebating. But is it entirely just or expedient? The present method of making tariffs was devised and put in force by the Interstate Commerce Commission. If it does not present rates in such shape that they can be easily and accurately quoted this is because the rate fabric is itself necessarily so complicated that the commission, with the advice of railway officers and shippers, has been unable to devise a means for making tariffs simple and intelligible. The average shipper handles only one or a few commodities; and he often is better-able to figure out the rates on these commodities than is the railway man, whose time and attention are necessarily spread over a vast multiplicity of tariffs and rates. If the proposed legislation were enacted it would make it necessary for the roads narrowly to limit the number of persons who might quote rates in writing; they could not afford to take the risk of having them quoted by so many clerks and agents as at present, and delay would result, about which we may be sure there would soon be loud and numerous complaints. It is a proposition to fine the carrier, not for intentional wrong-doing, but for mistakes. Would men in any other line of business think it fair that fines should be imposed on them or their companies for unavoidable and unintentional errors made by themseives or their subordinates?

(4) Mr. Taft recommends that the commission shall be given the same power to change classifications as to change rates. There really is no fundamental difference between the act of reducing the specific rate on a commodity and the act of changing the place of a commodity in the classification. But it will be noted that when the commission changes a specific rate between specific points the change is far less sweeping than a change of classification, for the latter involves a change in the rates on the commodity affected throughout the large territory in which particular classification is applied.

(5) The advisability of giving the commission the power, as Mr. Taft proposes, to initiate investigations and hearings on its own motion seems very doubtful. If there is any substantial ground for complaint against a railway some shipper or shippers' organization is pretty sure to make it. To give the commission power to start investigations and hearings on its own motion is to enlarge its functions as a prosecuting attorney, and is in direct antagonism to Mr. Taft's wise recommendation that the commission's present duty of conducting proceedings against railways in the courts shall be transferred to the department of justice. If complaints are to be initiated by any governmental authority let the duty be put on the department of justice. Even assuming that the commission is now entirely unbiassed and impartial, it is constantly hampered in its work by the doubt of railway officers as to whether it is so. Such doubts are not to be reduced or eliminated by increasing its prosecuting functions.

(6) The commission has asked that it be given power in its discretion to postpone indefinitely any proposed advance in rates, pending investigation of its reasonableness. The President's recommendation as to this matter is more conservative. He proposes that the commission shall be empowered, when railways file tariffs announcing an advance in rates, to begin at once an investigation of its reasonableness, and to postpone for not more than 60 days the time when it shall become effective. If the commission at the end of this 60 days has not completed its investigation the rates shall go into effect. This plan is less open to objection than that advocated by the commission, but nevertheless it is open to strong objection. Rates must now be filed 30 days before they become effective. Past experience and the commission's own official utterances show that it regards all proposed advances as *prima facie* unrea-

sonable. That either it, on its own motion, or some shipper or shippers, would complain against every proposed advance of any consequence, being certain, and it seems equally probable that the advance would be postponed the full period allowed by law. In other words, practically no advance could be made effective on less than 90 days' notice. Past experience also indicates that in almost every instance the commission would hold the proposed advance partly or wholly unreasonable. The great difficulty railways now have in making any advances whatever in their rates would be much increased. But, as we repeatedly have pointed out, whatever tends to prevent increases will also tend to restrain traffic managers from making reductions and increase the tendency of the rate fabric to become petrified. The public interest not only does not require any further legislation limiting the discretion of traffic managers in initiating rates; but every further enactment in this direction will be against the public interest. The average freight rate per ton per mile in France is 14 mills, in Germany 13 mills, and in the United States 7.59 mills. To the restrictions on the rate-making power of the railway officers of France and Germany and the past unfettered exercise of that power by the railway officers of the United States is largely due the superior adjustment of rates to conditions in this country which alone has made the much lower average rate in this country possible.

Discussion of some of the other recommendations in the message, especially the somewhat complicated plan for restricting the issuance and ownership of railway securities, will be attempted in a later issue. It is sufficient for the present to call attention to the fact that in every instance where governmental security-issue regulation has as yet worked at all it has worked against the public interest.

NEW BOOKS.

The Protection of Railroads from Transmission Line Crossings. By Frank F. Fowle. New York: D. Van Nostrand Co. 69 pages; 35 illustrations. Cloth. Price, $1.50.

The subject matter of this book was first presented in the form of a paper before the annual convention of the Association of Railway Telegraph Superintendents. The early portion is occupied with a discussion, in some detail, of the dangers that surround the use of transmission lines carrying a high voltage and the accidents and destruction of property that may result if they are not properly constructed and protected. As the title indicates, attention is turned directly to the matter of so carrying these lines over the tracks and wires of a railway that there shall be a minimum of danger from falling and crossing the wires beneath. Various types of crossings are discussed, and a few structures are shown in the engravings. For the most part, however, the engravings are half-tones of poles that have failed because of fires set by improperly protected wires. The subject matter is well worth the careful attention that it is probably receiving, though it is doubtful if any electrical engineer will find that any new light has been thrown upon a subject that has already become the subject of careful regulation.

Westinghouse E.-T. Air Brake Instruction Book. By W. W. Wood. New York: Norman W. Henley Publishing Co. 242 pages; 5 in. by 7 in.; 48 illustrations. Cloth. Price, $2.00.

This book deals exclusively, as its title indicates, with the latest design of Westinghouse air brake for steam railways, known as the E.-T. (engine-tender) brake. The Westinghouse brake has grown in the complication of its details from the simple beginning of the straight air brake, until it outclasses the locomotive itself and requires close and uninterrupted attention for a long time before its many details of construction and action can be understood. Therefore, anyone taking up a book on the subject must expect to pay strict attention to the matter if it is the intention to master the subject. The writer of the book in hand, who is an air brake instructor, evidently realizes this, and while the explanations are as simple as it seems possible to make them, the mind cannot wander during the study and get results. The general scheme of the explanations is to take a typical distorted diagram of the several parts of the whole and show the spaces between the casing and moving details, in different colors; these colors representing the various air connections and pressures with which they are filled. The general diagram of the whole apparatus is taken bodily from the instruction book issued by the Air Brake Association with the addition of these colors, which add immensely to the value. In this the various pipes are shown in colors that indicate as to whether they are filled with air at the pressure of the main reservoir, the brake cylinder, the atmosphere, and so on. It is impossible to refer specifically here to all of the parts that are shown, but we may take the distributing valve as an example. There is a diagram of this, with all parts distorted so as to show the working plainly, and this is repeated with the moving details in the several positions that they will ocupy in charging, application, service, lap, emergency, emergency lap, recharging, independent application, independent lap and independent release positions. A careful study of the engravings in connection with the text will give any one of ordinary intelligence a good, clear idea of the way in which the valve works, though it will not show the actual construction, which can best be obtained from an examination of the dissected valves that are usually to be found in instruction cars.

The diagrams have been carefully worked out and are clear. Unfortunately the same cannot be said of the reference letters, which are so small that it is with difficulty that one with the best of eyesight can decipher them. They are down to the last limit of size, so that any dimness of the light makes them troublesome. Other than this, the work is to be especially commended. It can be recommended to those who need know about the brake, and it would be well for all such to go through this book carefully and in detail, comparing the text sentence by sentence with the engravings before going into the air brake instruction car at all, and then, when this is done, it will be found that the explanations of the instructor will have a greater significance and clearness. In fact it would be well to take the book into the car for reference and assistance while the lesson is in progress.

Letters to the Editor.

PROPOSED LEGISLATION REGARDING SAFETY APPLIANCES.

To the Editor of THE RAILWAY AGE GAZETTE.

You have noticed the action of the Lower House of Congress in passing a bill (H. R. 5702) to give the Interstate Commerce Commission power to designate the "number, dimensions, location and manner of application" of certain safety appliances on cars, its requirements in this regard to be standard for all railways unless changed by order of the commission. It is to be hoped that before this or any similar measure shall become a law a full and comprehensive view can be had of the situation for the benefit of the public and the legislative and judicial branches of the Government in order that justice may be done.

In the first place, what is contemplated in the existing Safety Appliance acts? The law of 1893, with amendments of 1896, is as follows: Section 1 requires power brakes and train brakes; Section 2 requires automatic couplers; Section 3 defines liability in interchange; Section 4 requires secure handholds; Section 5 defines standard height of draw bars; Section 6 states penalties for violation and duties of prosecuting officers; Section 7, power of commission to extend time; Section 8, employer's liability.

The law of 1903 provides: Section 1 extends operation of the law to the territories and District of Columbia; Section 2 defines percentage of train brakes, gives authority to commission to increase same, and prescribes penalty for violation; Section 3 defines date effective and scope as regards the law of 1893.

What is the present situation? The railways have practically complied with the requirements made on them in Sections 1, 2, 4 and 5 of the law of 1893, having received certain extensions of time as authorized by Section 7. They have also complied with Section 1 of the 1903 law, also with Section 2, which was changed by the commission from a 50 per cent. requirement to 75 per cent., under which railways are now operating. Nearly all cars have now been equipped with air brakes, and air brake equipping may be said to be practically complete.

The work remaining for the railways to do is, therefore, the maintenance of these brakes, couplers, grab irons and handholds, and the work of the commission's inspectors is to see that this is done.

I need not remind you or your readers of the peculiar relations between railways in the matter of interchange of cars. In no other branch of business can there be found such exchange and use of facilities and equipment, with no other bond than a mutual agreement to be governed by a code of rules. These rules, now over 30 years old, make a common freight transportation system so far as the public is concerned. This code of rules has been revised year after year in the annual convention of the Master Car Builders' Association; but all the time retaining the original principle of interchange, that foreign cars would receive the same care and attention as owners' cars.

This is a daring and unique experiment in trust and good faith. It depended on the application of the Golden Rule. This experiment has, however, proved a magnificent success, the proof of this being in the relatively few disputes between roads. The arbitration committee of the Master Car Builders' Association, which is the court of final appeal, gave decisions last year in 35 cases, 34 the year before, and only 16 in 1907. The bills passed between railways in that period for repairs undoubtedly amounted in the aggregate to millions of dollars.

To the railways is due the credit for inaugurating and continuing the interchange of cars that has contributed so much to national prosperity, and the magnificent result achieved is a proof of the wisdom, care, prudence and high mechanical attainment of the Master Car Builders' Association. Its work has no precedent nor parallel in other corporate effort.

Judging by the results obtained, should not the Master Car Builders' Association be considered an expert, authoritative body in matters relating to car construction, maintenance and repair?

Besides the code of rules the work of the association is in part embodied in a voluminous collection of Standards and Recommended Practice, filling nearly 100 pages of text and 60 large sheets of illustrations. These have been revised as the Safety Appliance Acts became effective so that all of the legal requirements were included, and Secretary Moseley has frequently commended the rules. In 1898 he said in a letter to the president of the association (Proceedings, pp. 91-2):

"If time shall demonstrate the necessity of changes in legislation regarding railway equipment in the matter of safety appliances, the advice and experience of that body, of which you have the honor to be the head, will again, as they have in the past, undoubtedly be of the greatest consideration and assistance in determining on what lines and in what degrees the alterations should be made."

In 1902 he made the first of his seven annual addresses, pp. 103-107, in which there are several references to little legislation being necessary if M. C. B. Standards were made compulsory. In 1903 he closed his address, found in Proceedings, pp. 52-60, with the following sentence:

"As I have studied this question, year after year, there is one earnest wish that I would utter; and that is that the recommended practice of the Master Car Builders' Association shall be the actual practice of the railways of the country; and that the Congress of the United States would perfect the law by adding to it a provision which shall require that the standards established by the Master Car Builders' Association shall be the standards upon all railways engaged in interstate commerce."

In 1904, 1905, 1906 and 1907 he spoke in the same strain. In 1908 he called attention to the bills pending to make the M. C. B. standards a part of the law, but did not mention the other bills in which these appliances are to be set forth by the Interstate Commerce Commission. He called attention to new laws and decisions, referring to the ash-pan bill in a way that was particularly exasperating to those who knew something in connection with this matter. He took occasion to laud his inspectors, and, while complimentary to the association, had less to say about the association's authority and more about the law, its present force and probable future scope.

The standards for the protection of trainmen referred to above are those appliances used for getting on and off cars, and used in connection with coupling and uncoupling of cars. These were originally formulated by the association as early as 1888, and were amplified in 1893 and 1896. In the latter year a special committee of eleven members, assisted by representative trainmen and switchmen, determined on a schedule of handholds for the various types of cars, and classed the brakestep, bracket and coupler unlocking rod as satisfactory handholds. The report of this committee was adopted by the convention in 1896, and M. C. B. plate *A* was the first to show the various arrangements of handholds as proposed and adopted. Those remained as Recommended Practice until 1902, when they were advanced to Standard Practice.

In 1907 and 1908 the association took steps to put these standards in still clearer shape, so as to make them susceptible of but one interpretation. Additional plates were made to cover development in car design and construction, notes were added to the plates so that the fullest possible information was made available. These revisions, which in no way altered the original intent of the standards, are all based on the original schedule and arrangement.

The recorded expressions of the Secretary of the Interstate Commerce Commission for seven years were to the effect that these standards were used in construing the law and in some details were more comprehensive than the law; yet the instructions under which the Interstate Commerce Commission inspectors are now working are said to state that M. C. B. Standards do not comply with the law. If such is the case, why was it not known before? It is quite well known that if the Secretary of the Interstate Commerce Commission and his inspectors had their way, practically three-quarters of the M. C. B. safety appliance regulations would be changed.

The development of this sentiment against the standards has occurred since 1908, and it might be pertinent to ask if the inspectors and other advisers of the commission and its secretary are superior in judgment capacity and mechanical attainment to the members of the Master Car Builders' Association, who have developed the standards now claimed to be illegal.

It is well known that these inspectors are men who have had railway training as brakemen, switchmen, and in other like subordinate positions, and while this is no discredit, and no slur is intended to be cast, is it at all likely that they have the capacity to sustain the contention that three-quarters of the M. C. B. standards are wrong, as against the united opinion of such a body as the Master Car Builders' Association? As it is not likely that Secretary Moseley will assume all the responsibility for opinions so adverse to those of the association and which are a complete reversal of his earlier opinions, we are forced to conclude that the power behind all this effort to upset M. C. B. standards and the recognized practice of the railways proceeds from a source that has swayed the secretary and his inspectors to take the stand they do; a stand where they hinder and obstruct rather than help and defend the railways. The railways have equipped their cars and engines with the appliances required by law and are maintaining them; and, when they do not they expect to pay the penalty. They believe, however, that the standards which have been established and accepted as satisfactory for all

those years prior to 1908 should stand as satisfactory at the present time and for the future, except as the evolution in car design may require modification of details. The purpose of the law is beneficent, to maintain the right as well as to punish the wrong. For those who administer the laws to use their official positions to promote the interests of any class of persons to the injury of another class is a prostitution of their public trust. X. Y. Z.

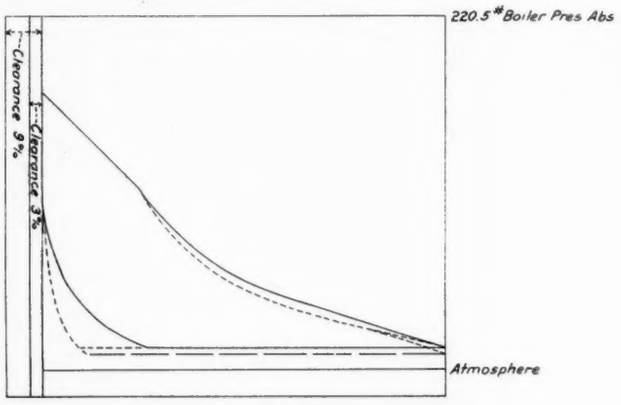
LIMITED SPEED OF PASSENGER LOCOMOTIVES.

Philadelphia, Pa., Jan. 8, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The writer has read with considerable interest the admirable article which appeared on page 1225 of your issue of December 24, 1909, entitled "Limited Speed of Passenger Locomotives." While the article referred to is very exhaustive in certain respects, it seems to the writer that two of the most important factors which affect the high speed performance of locomotives have not been considered.

These are, first, the relation of cylinder clearance volumes to the weight of steam used to develop a given power, which steam has necessarily to pass the exhaust nozzle, and second, the necessarily high piston speeds, both of which have an important bearing on the negative work required to overcome back-pressure and compression.



Theoretical Indicator Diagram.

For the purpose of illustration, the writer has constructed the theoretical indicator diagram herewith. In constructing the diagram above referred to the writer first laid out a Zeuner diagram, assuming a steam lap of 1¼ in. and a steam lead of $\frac{3}{16}$ in. When cutting off at quarter-stroke the maximum openings to steam and exhaust were found to be $\frac{5}{16}$ in. and $1\frac{11}{16}$ in., respectively, the valve having ⅛ in. exhaust clearance.

The exhaust opening event occurs at 66 per cent. of the forward stroke and the exhaust closing event occurs at 74 per cent. of the return stroke. The full line diagram is a card based on the above events, and 9 per cent. cylinder clearance volume, which is usual in locomotive practice. The stroke of the piston has been assumed as 26 in. and the speed as 350 r.p.m. These give a piston speed of 1,516⅔ ft. per minute, at which speed the writer has assumed the back-pressure to be 13½ lbs. per square inch above atmosphere. The reduction of initial pressure and wire-drawing during admission have been figured from tables given in George R. Henderson's "Locomotive Operation." The mean effective pressure of the full line card is 47.54 lbs. per sq. in.

The writer then assumed a cylinder clearance volume of 3 per cent., exhaust opening to occur at 80 per cent. of the forward stroke and exhaust closure to occur at 91⅛ per cent. of the return stroke, wire-drawing and back-pressure are assumed to be the same as in the full line card, and the piston speed remaining the same. The resulting card is shown where it differs from the previous one by dotted lines. The mean effective pressure of this diagram is 49.32 lbs. per sq. in.

The indicated water consumption of the full line diagram is 19.73 lbs. per h.p. hour, while the dotted line diagram is using but 18.5 lbs. The unindicated losses, which affect the water rate with 3 per cent. cylinder clearance volume have been found by experiment to be approximately 25 per cent. of the indicated water rate, and as these losses vary directly with the area of the clearance walls, which with 9 per cent. clearance would be at least 25 per cent. greater than with 3 per cent. clearance, the unindicated losses with 9 per cent. clearance will be close to 31 per cent. of the indicated water rate. On this basis the total water rate for 9 per cent. clearance becomes 25.85 lbs. per h.p. hour, and for 3 per cent. clearance it becomes 23.13 lbs. per h.p. hour.

If we assume a locomotive with cylinders 22 in. in diameter, at a piston speed of 1,516⅔ ft. per minute, the horse-power with 9 per cent. clearance will be 1,661. With 3 per cent. clearance it will be 1,723. Multiplying water rate by horse-power we find that the engine with 9 per cent. clearance will use 42,937 lbs. water per hour, while the one with 3 per cent. clearance will use 39,853 lbs. per hour. Thus it will be seen that although the engine with 3 per cent. clearance will develop 62 horse-power in excess of the one with 9 per cent. clearance, it is done with a water consumption of 3,084 lbs. less per hour. If the water rate of the engine with 3 per cent. clearance would remain the same we could augment its power to 1,856 h.p. with the same total water used to produce 1,661 h.p. in the one with 9 per cent. clearance, while the effect of the exhaust nozzle of the engines on back pressure would be the same, the weight of steam being the same in both cases.

Thus it will be seen, that, although it is not generally accepted as so, clearance volume is probably the largest factor limiting the high-speed performance of locomotives.

Passing to the consideration of piston speed, stationary steam engineers recognize as a fact that back pressure increases directly with the squares of the piston speeds.

The writer has assumed that the stroke of the piston in the foregoing example has been shortened to 24 in. At the same rate of revolution this would give a piston speed of 1,400 ft. per minute, compared to 1,516⅔ ft. per minute with 26-in. stroke. The square of 1,400 is approximately 85 per cent. of the square of 1,516⅔, and it follows that if our friends are correct as to the relation of piston speed to back pressure, we will have but 85 per cent. of the back pressure (28.2 lbs. absolute) of the engine with 26 in. stroke, in the engine with 24 in. stroke, which is 9.27 lbs. per sq. in. above atmosphere. This the writer has indicated on the theoretical diagram by a dashed line. Advancing the exhaust closure so as to give the same terminal pressure of compression, it will be seen that although we have enlarged the diagram with 3 per cent. clearance so that its mean effective pressure is 50.3 lbs. per sq. in., the total water used remains the same, while the indicated water rate becomes 18.14 lbs. per h.p. hour.

Making allowance for the slightly greater range of temperatures we find that the unindicated losses are 26 per cent. of the indicated water rate, making a total water rate of 22.86 lbs. per h.p. hour.

By shortening the piston stroke we decrease the cylinder volume, to make allowance for which it will be necessary to enlarge the bore of the cylinder with 24-in. stroke to 22⅞ in. This will give the same cylinder volume which we had in the cylinder with 22-in. bore and 26-in. stroke and makes the two engines equal in power developed per pound m.e.p. The engine with 22⅞ x 24-in. cylinders at a speed of 1,400 ft. per minute will develop 1,749 h.p., and use a total of 39,994 lbs. of water per hour. Assuming that the water rate of 22.86 lbs. per h.p. hour would hold, this engine could develop 1,878 h.p. on a total water consumption of 42,937 lbs. per hour,

which is the same quantity used to develop 1,661 h.p. in the engine with 22 x 26 in. cylinders and 9 per cent. cylinder clearance, while the weight of steam to pass the exhaust nozzle would be the same.

The above is all pure theory, for the use of which the writer may be criticised, but experience has shown that theory is the best guide to practice. Hence the use of it.

Reverting from theory to practice it is a well-known fact that all of our present valve gears give a very limited opening for steam admission when working at short cut-off, and although it has not been generally noted, as far as the writer's observation goes, the openings for exhaust are equally disadvantageous, for although the opening is large it is at its maximum very early in the stroke and gradually decreases until at half stroke, where the piston speed is at its maximum, it is rarely over three-quarters of an inch. This narrowing of the exhaust port opening will account for the abnormal rise of back pressure found on cards from locomotives at high speeds. It may be argued that this wire drawing of the exhaust is beneficial, as it decreases the water rate of the engine, but as it decreases the m.e.p. at a much faster rate than it does the water rate it may be truly stated that it is a large source of loss.

The writer knows of several devices to obtain the admirable results which he has mentioned in this letter, but they all have inherent defects or weaknesses which preclude their extensive application, and he is now engaged in perfecting a device which he hopes will overcome all objections.

CHAS. F. PRESCOTT,
Mechanical Engineer, Barber Asphalt Paving Co.

NORTHWEST DEVELOPMENT BY GRAND TRUNK PACIFIC.

The United States Consul-General at Winnipeg, Man., says concerning the Grand Trunk Pacific, which is being built across the continent by a company under agreement with the Canadian government:

"During the current year there were in operation 1,017 miles on the main line and 315 miles on branch lines. There are now under construction, to be finished this year, 650 miles, of which 210 are on the main line and 440 on branch lines. Since construction work has sufficiently advanced, settlers' effects have been moved into the different areas along the line, and on September 21, 1909, the first train carrying passengers, for the accommodation of settlers, was inaugurated. To facilitate the grain movement the company in 1908 erected 44 grain elevators, with an average capacity of 40,000 bushels each; and 50 additional grain elevators will be completed to handle this year's crop.

"A terminal storage and transfer elevator under construction at Fort William has a total capacity of about 10,000,000 bushels. The first unit of this elevator is rapidly nearing completion, and will hold 3,800,000 bushels.

"The prairie section of the Grand Trunk Pacific, which extends from Winnipeg to Wolfe Creek, a distance of 917 miles with its branches, serves a large grain-growing and mixed farming country. In addition the railway's route is over the interior plain or plateau of northern British Columbia, between Fort George, on the Fraser river, and Prince Rupert; the entire area, with but few exceptions, being suitable for either farming or ranching to a distance of within about 100 miles of Prince Rupert. The interior plateau referred to is approximately 400 miles long and stretches north to the Peace river and south an approximate distance of 75 miles, containing about 50,000 square miles of territory, 25 per cent. of which is suitable for grain growing and the production of the hardier fruits. There are in this section also considerable mineral deposits and much coal of bituminous and some of anthracite character. The cost of the prairie section has been about $35,000 per mile (figures furnished by the Grand Trunk Pacific officials). There is $2,000,000 worth of heavy bridge work yet to be done in order to preserve the low grades throughout. The Grand Trunk Pacific claims that it will save approximately 500 miles, operating from Prince Rupert to Yokohama, over the present grain-carrying route to the Orient via the Suez canal.

"The Grand Trunk Pacific is now operating three steamers on the Skeena river, and they are busily engaged in transporting supplies for the mining and trading of the interior country. The Skeena river is one of the principal torrential streams of British Columbia, and its fisheries are noted.

"The company has recently placed on the market town sites in Prince Rupert, and has realized excellent prices for the same. It is interesting to note that 80 new town sites have been opened along the main line of the prairie section, between Winnipeg and Edmonton. The work is being hurried with all possible despatch.

"The active work of locating the line of the Hudson Bay Railway commenced October 18 at the Pas Mission. Other parties will be sent out later. The preliminary survey of the road, which was completed this year, has given the engineering staff weeks of labor to figure on grades and the facilities of various routes. Lakes and other difficulties in the formation of the country will furnish engineering problems, but it is the intention to push the location line as fast as possible. The party will work out all winter, receiving supplies by dog trains. Progress is aided by the frost closing up swamps and muskegs, and killing the mosquitoes and sand flies which infest this region. Directness in the lines is aimed at, with a low grade for the grain haul toward the bay. The terminus on Hudson Bay has not yet been decided."

FOREIGN RAILWAY NOTES.

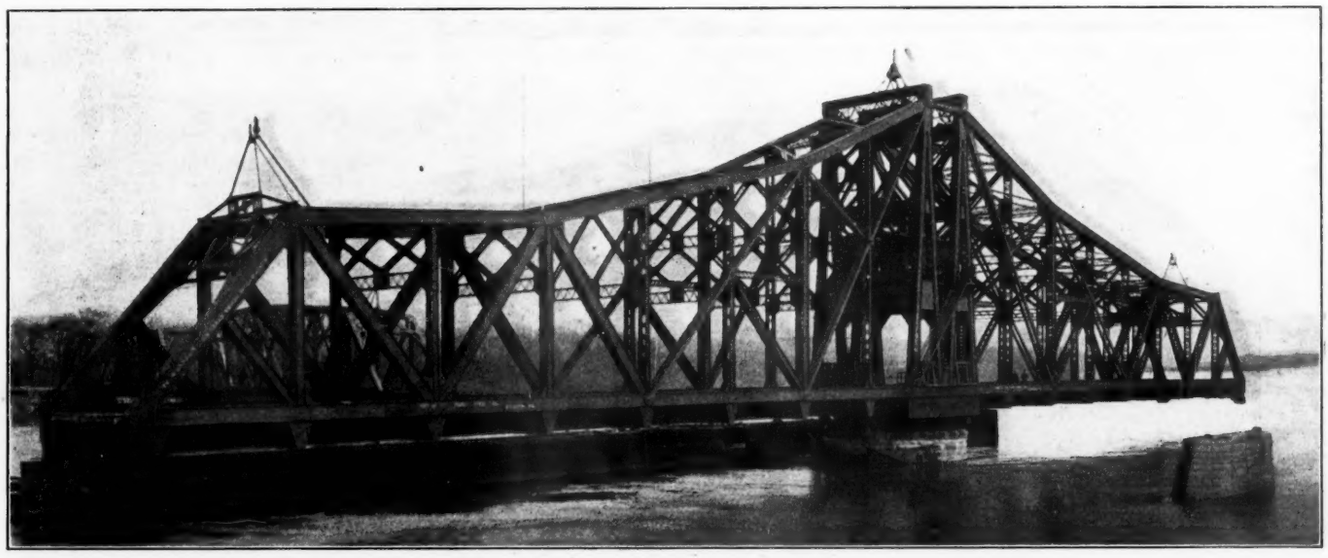
A bill has been introduced in the Orange River Colony legislature providing for the building of a railway from Bethlehem, on the Bethlehem-Harrismith Railway, to Villiers, on the Vaal river, and thence to a point on the Germiston-Volksrust line in the Transvaal.

A consular report says that a Franco-Belgain group of capitalists is seeking a Turkish government concession to establish a regular service of freight and passenger cars drawn by traction engines between Trebizond and Erzeroum, with the privilege of extending the system to the Persian and Russian frontiers. The consul describes the plans: What is known as the "Pierry system" of steam traction engines and cars is to be employed. No rails are required. A French engineer has recently been studying the route. He estimates that the route when reconstructed will be 310 kilometers (192 miles) long from Trebizond to Erzeroum. The road will have to be widened and the curves enlarged. One tunnel about 1,200 meters (1,320 yards) long will be required at Ziganna. He estimates the cost of constructing the road, which the company proposes to do itself, at $579,000 to $772,000, and the total cost, including equipment, at about $1,158,000. Ninety road men would keep the road in repair and act as road police. The steepest grade will be about 13 per cent. He thinks the trains would make about 20 kilometers (12 miles) an hour) an hour. He calculates that at present about 25,600 tons of freight is transported annually from Erzeroum to Trebizond. His figures are nearly double the actual amount at present, but with a good, regular and cheap transportation system the amount of freight would increase considerably in a few years. It appears that about 25,000 tons of freight per annum ,including Persian transit goods, now go from Trebizond to Erzeroum.

THE CLINTON BRIDGE OF THE CHICAGO & NORTH WESTERN.

The new double-track bridge of the Chicago & North Western over the Mississippi river at Clinton, Iowa, has a total length of 4,200 ft., was two years in building, the authority for expenditure having been issued March 21, 1907, and the contracts let the following May.

The Clinton crossing, which was the second bridge to be built across the Mississippi, has an interesting history. The first Clinton bridge was built in 1859 and 1864. As shown by the map and the elevation of the bridge herewith, the river has two channels at this point, the east and the west, separated by Little Rock and Willow islands. The original cross-



Clinton Bridge; 460-ft. Swing Span.

ing of the east channel was built in 1858-9 by the Chicago, Iowa & Nebraska Ry., which connected with the Chicago & Galena Union Ry., the parent line of the North Western system, by a line of 2½ miles up the east bank of the river to Fulton, Ill. Service over the west channel, which, although the narrower, is much the deeper and more important of the two, was maintained by a car ferry. The Chicago, Iowa & Nebraska was leased by the Chicago & Galena Union in 1862, and the west channel was bridged two years later. This first crossing had all wooden spans, except the draw span. The east channel portion was made up of McCallum trusses resting on cut stone piers on a foundation of piling capped with a wooden grillage. The west channel fixed spans were Howe trusses and the swing span was of the Bollman pattern. The center posts, turntable and end posts of the swing span were cast iron, the top chord two 12-in. channels with 12½-in. cover plates top and bottom, and the bottom chord two 6-in. channels with 12-in. cover plates top and bottom. The abutments and piers in the west channel were cut stone and are still in good condition. All of the spans over both channels were renewed from one to three times, the easterly McCallum truss span, for example, being replaced by a 200-ft. pin-connected Pratt truss span in 1869, and heavier spans of similar pattern being substituted again in 1881 and 1898 respectively, making three renewals. The draw span was renewed in 1887, and important repairs made to it in 1901.

As shown by the map herewith, the new bridge was built 40 ft. south of and parallel to the old bridge. This map also shows the location of the high-level highway bridge, seen in some of the photographic views, which crosses over the level of the railway bridge on Little Rock island. All elevations shown on the drawings are from the U. S. Engineers' datum plane, the extreme observed low water elevation being 0.7 ft., and extreme high water 21 ft. above this plane.

The new crossing has three separate steel structures, separated by embankments. The easterly structure is over a slough and is 550 ft. long. In the old bridge this slough was crossed by a pile trestle 1,390 ft. long, which formed the approach to the east channel section. The bed of the slough at the surface is muck a few feet down, below which is sand. There is little or no flow of water below a stage of 10, and standing timber at the head of the slough prevents drift or

West Channel Spans.

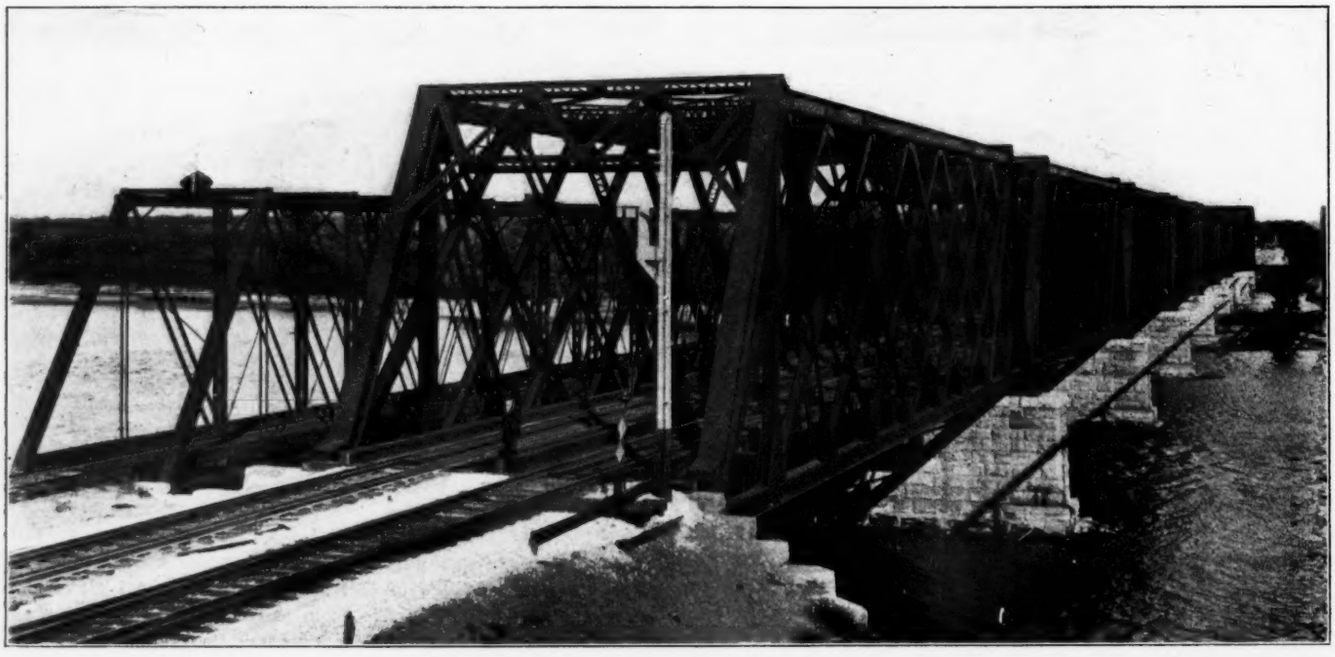
ice from being carried through. The bridge consists of 11 double-track plate girder deck spans carried by Cushing cylinder piers on piling. There are 15 to 18 piles to each cylinder, averaging 28 ft. long. The cylinders are 8 ft. in diameter, made of ⅜-in. plates, and capped with white sandstone. The abutments are red rock sandstone on concrete footings supported on piling. The superstructure of plate girders and cross girders was completed in July, 1908.

Between the slough spans and the east channel spans is a sand embankment 778 ft. long, made by a hydraulic dredge from the east channel. It has an average height of 18 ft. and contains 40,700 cu. yds. The embankment between the east and west channel spans, across Little Rock island, was made in the same way and contains about 10,100 cu. yds.

All piers and abutments of the east channel spans are built of dimension stone masonry, and all rest on piling except the westerly abutment, which was carried to rock. The seven

to adopt methods in building the former which would disturb the old piers as little as possible. The old bridge was carrying a traffic amounting at times to 150 train movements in 24 hours and it was absolutely necessary, of course, that there should be no interruption to this traffic. All of the piers but one were founded in open cofferdams, the exception being due to the presence in the river bed of the wreckage of a span of the adjacent steel highway bridge, blown there by a heavy wind some years ago. As it would have been necessary to remove this span before steel sheet piling could be driven, piles were cut off under water with a rotary saw and an open caisson landed on them.

While some settlement of the old piers occurred, in only one instance did the vibration from driving steel sheet piling cause settlement serious enough to require extreme precautions. This was pier 16. To prevent an inflow of material from around the old pier, the piles of the new pier were cut off



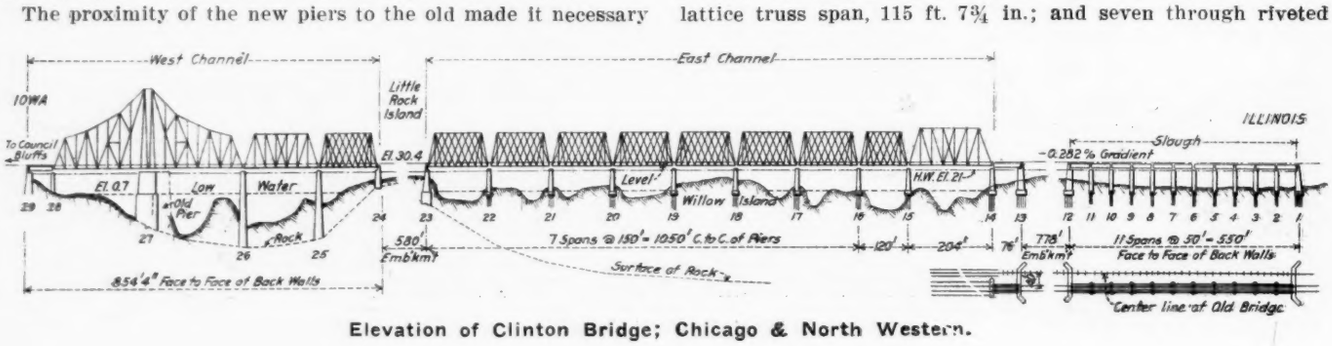
East Channel Spans, Looking East. Old Bridge on the Left.

westerly spans of the new bridge are the same length as the old, bringing the piers of the two opposite to each other. The riprap around the old piers, which gave a ground line for the new varying from above low water at the upstream end to a depth of 20 ft. or more at the downstream end in some instances, caused a variation in the method of founding the piers. Where the ground surface over the area of the footing averaged only a few feet below the water level, the concrete footing was deposited directly on the piling. Where the water was deep on the downstream side the piles were completely surrounded with riprap to obtain a level bottom, upon which a timber crib was lowered. The first plan was used on piers 13, 14, 16, 18 and 19, and the second on the remainder.

The proximity of the new piers to the old made it necessary at 11 ft. below low water and a part of the concrete footing deposited through a tremie pipe before pumping out the cofferdam.

For handling material for the substructure a temporary double-track pile trestle was built. It has 16-ft. spans, five piles to the bent and caps 28 ft. long. A stiff-leg derrick was set up on piling at each pier, but as far as possible the material was handled by a Brown hoist crane or a derrick car. The east channel structure was begun July 3, 1907, and finished March 14, 1908.

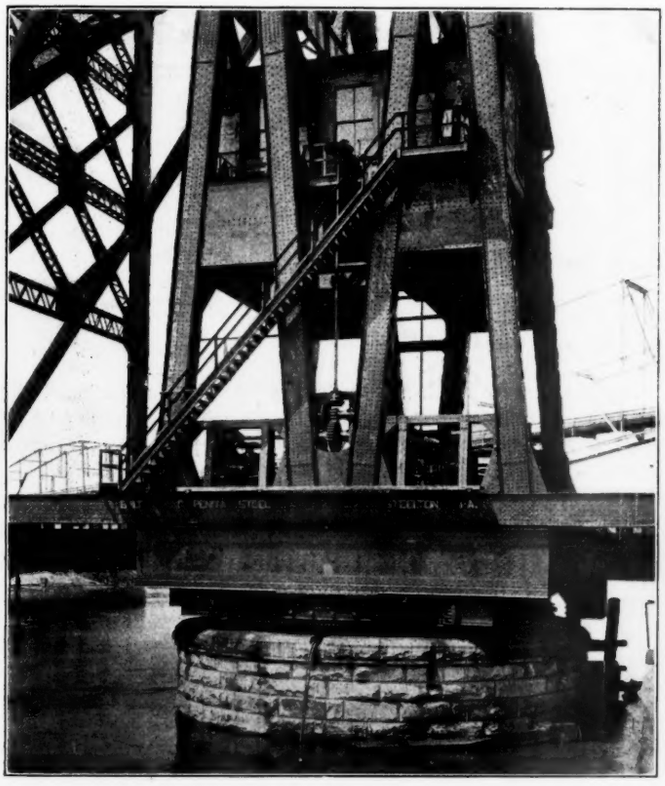
The substructure is composed of ten spans as follows, beginning with the east end: 74-ft. deck plate girder; through riveted Pratt truss span, 202 ft. 3¼ in.; through riveted lattice truss span, 115 ft. 7¾ in.; and seven through riveted



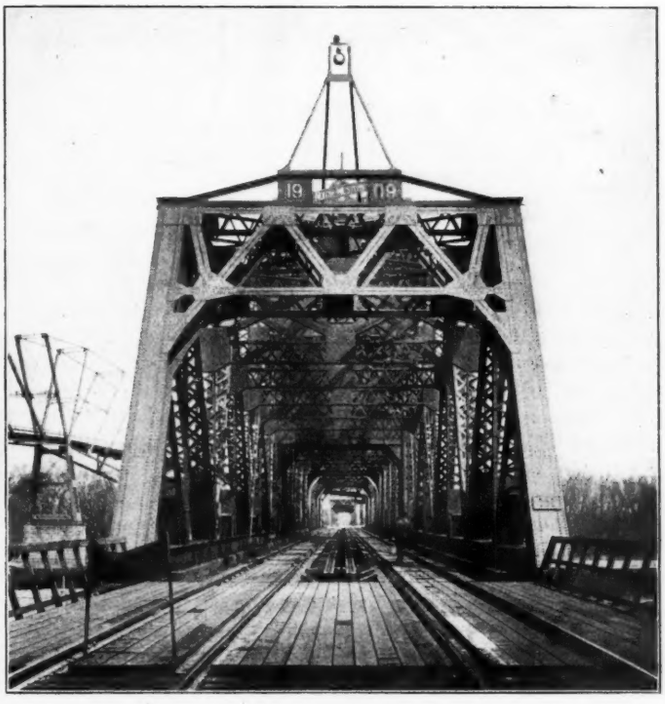
Elevation of Clinton Bridge; Chicago & North Western.

lattice truss spans of 146 ft. 5½ in. A general view of this portion of the crossing is given in the illustrations. The Pratt truss span which is of unusual length for a riveted span, is the longest riveted fixed span on the North Western. The steel work was erected from the falsework described in the previous paragraph without change. The stringers on the falsework were at the proper elevation to have the steel floor beams and stringers blocked up on them at their final level. These members would be laid complete for a span and the trusses then erected in position, supported by the floor beams, the falsework not being wide enough to support them directly. Balance in weight was maintained as nearly as possible by putting up opposite members of the two trusses consecutively. The work was done with a derrick car. It was begun January 27, 1908 and the last of the falsework was removed July 14, 1908.

The west channel, which, as already mentioned, is the



Detail View of Draw Span at Center Pier.



West Portal of Draw Span.

deeper and therefore the main channel of the stream, is 600 ft. wide at low water and 850 ft. at high water. As shown on the map, there are two government dams in the river between the east and west channels, built in 1891—one between Little Rock and Willow islands (the latter island is below high water) and the other extending westwardly from the upper end of Willow island. They are built of riprap and brush, extending 2 to 3 ft. above low water, and were designed to increase the flow in the west channel to scour away bars which had formed below the bridge. The map also shows a floating sheer-boom in this channel extending from the draw span protection pier to a point on the west bank about 1,000 ft. above the bridge. There is a strong set of the current from the east towards the west bank in this channel. For this reason timber and log rafts passing down the river use the east channel, except at low stages of water.

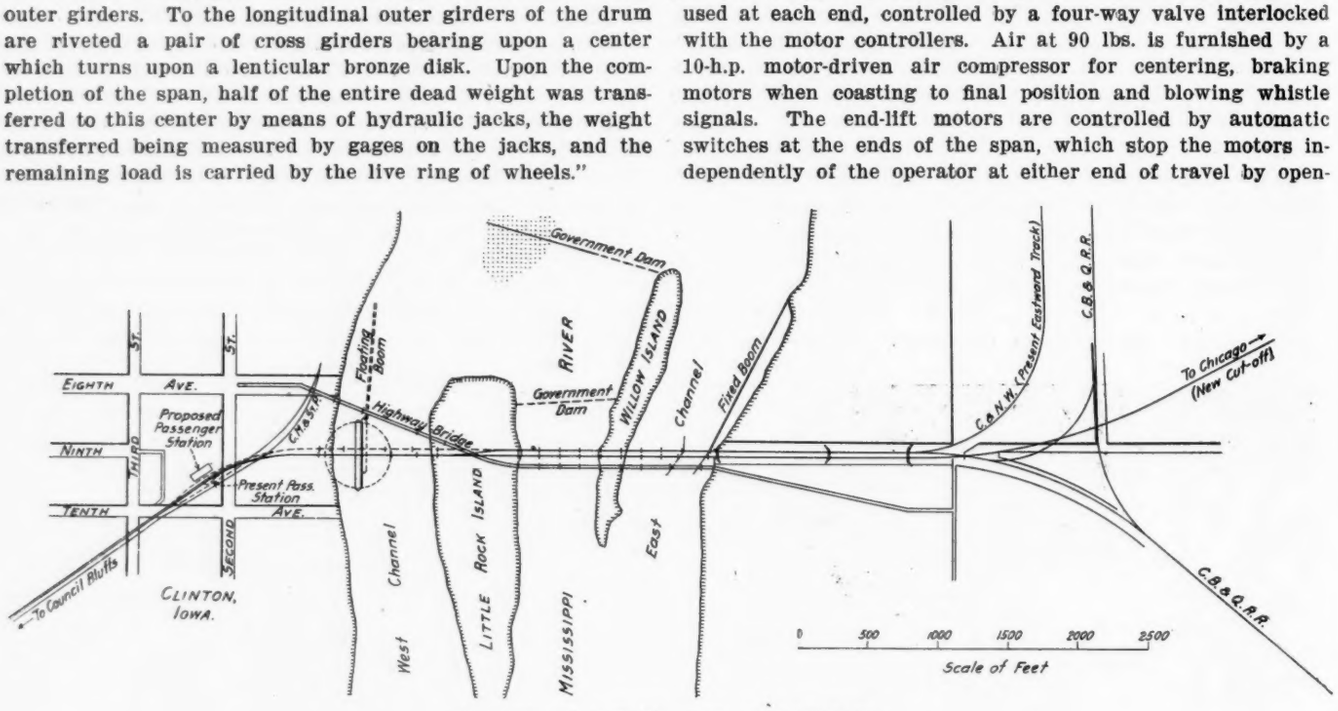
The new piers in the west channel are carried down to rock or other firm strata to avoid all danger from scour. Nos. 25 and 27 are on rock and 26 rests on hardened strata of sand and clay. The two abutments and pier 28 were built in open cofferdams, and piers Nos. 25, 26 and 27 were put down by the pneumatic process. Prior to putting down the first two, to minimize disturbance to the adjacent piers of the old bridge a single row of steel sheet piling was driven around each pier to what was thought to be safe depths. Only slight settlement occurred, the maximum being 2 in. at the south end of No. 25. In sinking the caisson for the center pier (No. 27), the east side had to pass through the crib of the old protection pier, while the opposite side was over deep water. This side was supported by a pyramid of sand bags on the river bottom and the air pressure kept carefully adjusted by a gage so as to preserve the proper balance as the caisson went down. Failure thus to maintain the equilibrium before the bed of the river was reached would have resulted disastrously, causing a serious displacement of the caisson. Details of the center pier caisson are shown in the illustrations. The west channel piers and abutments are cut stone masonry.

The superstructure contains four spans: one through riveted lattice span, 146 ft. 5½ in.; one through riveted Pratt span, 182 ft. 5½ in.; one through pin-connected swing span, 460 ft. c. to c. of end floor beams; one deck plate girder span, 52 ft. 7½ in. A temporary wooden pile trestle had been put in for handling the substructure materials, as for the east channel spans, and the fixed spans were erected on this with a derrick car as with the previous spans. The draw span was erected by means of a three-bent double-rail traveler. The work of raising this traveler was begun October 28, 1908. By December 12 the center of the draw span was all in and riveted up and the west arm erected complete. Navigation closed November 15 and the contractors were then free to proceed with the east arm of the draw.

The design of this draw span is worthy of special note, due to the fact that it was governed by a clearance of only 9.4 ft. between highwater line and base of rail. This condition was imposed by, (1) a grade crossing with the Chicago, Milwaukee & St. Paul Ry., about 400 ft. west of the bridge; (2) connections with the Chicago, Burlington & Quincy Ry., adjacent to the west end of the bridge, and (3) a grade crossing of Second street, Clinton. The resident engineer in charge of the construction of the bridge describes the design as follows: "To avoid the questionable expedients of double drums, or an entire center bearing, the weight of each truss

is carried to the drum by four posts arranged in pairs. The girders of the drum are arranged in the form of a square, with additional girders in the inner corners of the square so as to form an octagon. A circular tread is bolted to these outer girders. To the longitudinal outer girders of the drum are riveted a pair of cross girders bearing upon a center which turns upon a lenticular bronze disk. Upon the completion of the span, half of the entire dead weight was transferred to this center by means of hydraulic jacks, the weight transferred being measured by gages on the jacks, and the remaining load is carried by the live ring of wheels."

are located in the operator's house, have change gears for reducing the speed one-half. With the slow speed gearing and one motor, the bridge can be swung with only one engine. For centering and locking the span, air-operated plungers are used at each end, controlled by a four-way valve interlocked with the motor controllers. Air at 90 lbs. is furnished by a 10-h.p. motor-driven air compressor for centering, braking motors when coasting to final position and blowing whistle signals. The end-lift motors are controlled by automatic switches at the ends of the span, which stop the motors independently of the operator at either end of travel by open-



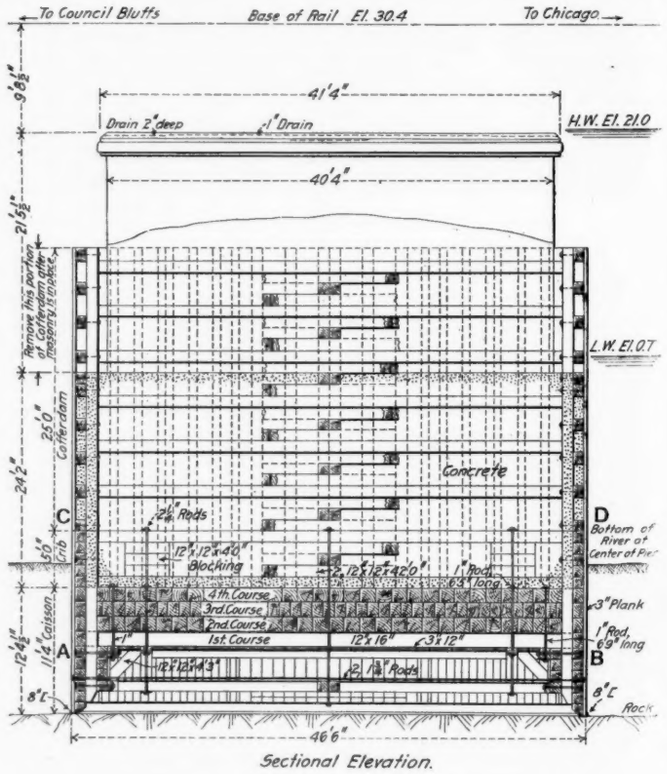
Map Showing Bridge Site and Vicinity.

A departure from previous practice has been adopted in the power installation for moving the swing span, in that the prime mover is located on the adjacent west shore instead of on the bridge. The reason is twofold: First, the size of the engines and their accessories, and, second, to free the span of the vibration which high speed gas engines cause when mounted on the structure. Another feature which determined the land location was the installation in the power plant of a large storage battery. The power house is brick and is 400 ft. from the center pier. As the bridge is swung from the batteries, and only in case of emergency from the engines, the latter are smaller than would otherwise be installed, since they are used ordinarily for charging the batteries only. They are twin cylinder, vertical 50 h.p. Otto gasolene engines, running at 360 r.p.m., direct-connected to Western Electric 300-volt 30-k.w. d.c. generators. The liability of shut-down is minimized through the following electrical combinations on the switchboard: From storage battery; from both engines working in parallel; from either engine separately; from either engine and battery in parallel. As the power may be used for other purposes than swinging the draw, meters are provided on each feeder leaving the switchboard, enabling accurate records to be obtained at all times. The storage battery contains 120 cells, having a total capacity of 640 ampere hours. The cycle of operations from the releasing of the motor controller levers to a full open draw is 1½ minutes, or 15 seconds for lowering the ends and 1¼ minutes for the swing. The battery has capacity for 16 swings at this speed and 8 additional swings at somewhat reduced speed, or 24 swings in all. The signals and derails and the different lights are operated from the battery.

Connection from the power house to the switchboard in the operator's house on the bridge is by means of a submarine cable sunk in the bed of the river. With the draw swinging 90 deg. either way and back, no pivot switch is used, the connection being through a flexible cable. The bridge is swung by two 50-h.p. street railway motors in parallel, and a 20-h.p. motor works each end lift. The swing motors, which

ing the circuit on the distributing board. Indicating lights on the switchboard show the operator when the plungers are in or out, when the ends of the span are raised or lowered, and when the bridge is full opened or nearly closed.

The end lift mechanism is the eccentric rocker type, first used on the Sabula bridge of the Chicago, Milwaukee & St. Paul by C. Shaler Smith nearly 30 years ago. It is the

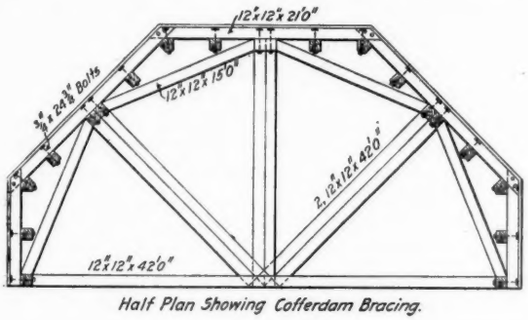


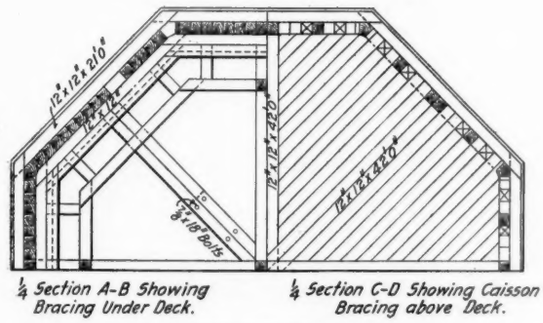
Sectional Elevation.

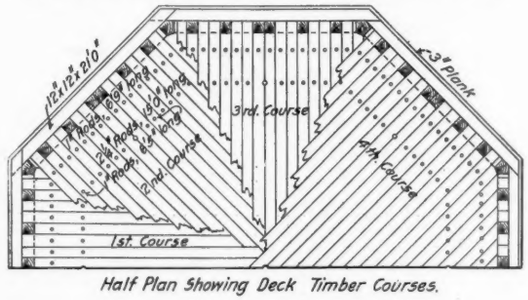
Details of Center Pier for Draw Span.

standard arrangement on the C., M. & St. P., but this is the first time it has been used on the North Western. It is thought that for a draw of this length and weight some advantage in time, and a multiplication of power in lifting the ends, might be obtained by substituting eccentric gears for the circular gears on the rocker shaft. It is estimated that a multiplication in power of about 2½ times could be obtained, and it is possible that this change in the present arrangement may be made later.

The steel superstructure of the bridge throughout is designed for Cooper's E-50 loading for each track. The weight of the deck is assumed at 550 lbs. per foot of track. Impact for moving load stresses is added according to the Pritchard formulas, (1) for stresses resulting from load on one track; (2) for stresses resulting from load on two tracks. The trusses are spaced 32 ft. c. to c., which is wider than ordinary, the purpose being to allow derailed cars to reach the guard timbers without striking the trusses. The minimum lateral




12"x12"x 21'0"
12"x12"x 42'0"
12"x12"x 42'0"
¼ Section A-B Showing Bracing Under Deck.
¼ Section C-D Showing Caisson Bracing above Deck.



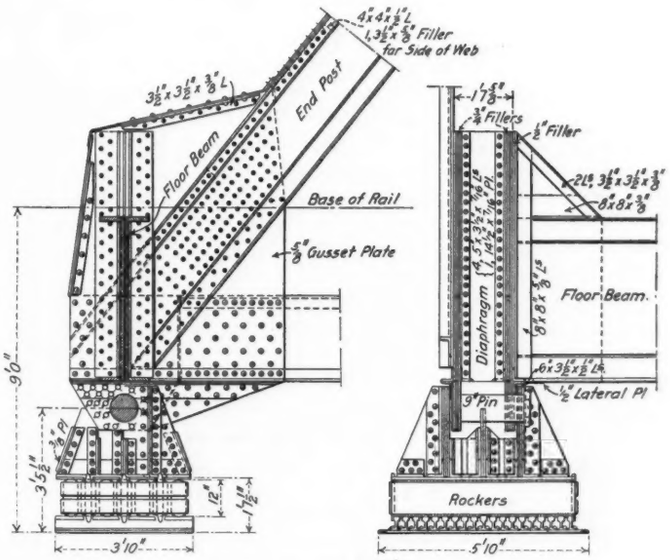
Caisson and Cofferdam.

clearance for trains is 8 ft. from center line of track, and the vertical clearance is 22 ft. 6 in. from base of rail. The tracks are 13 ft. c. to c.

The deck construction, which may be seen in the portal view, follows the standard type of the North Western. The ties are long leaf pine, 8 in. x 8 in., surfaced to uniform thickness of 7¾ in., and 12 ft. long. There is a 10-in. x 12-in. outer guard timber at each end of the ties, laid on edge, dapped 1 in. over the ties, and fastened to each with a ¾-in. bolt. Inside each rail, with the outside of the vertical leg 9½ in. from the inner flange of the rail is a 6-in. x 4-in. x ½-in. angle, with the 6-in. leg on the ties. Backing up this angle is a 4-in. x 10-in. plank laid flat and spiked to each tie. The end is attached to this plank by ½-in. screws, 4 in. long, and to every fourth tie with a track spike. Outside the rail, 4 in. from the inside flange, is another 4-in. x 10-in. plank, similarly spiked to the ties. In cases of derailment the wheels inside the track are carried by the guard angle and the treads of those outside ride the plank, saving the ties. To prevent rail creeping, "L. & S." anti-creepers are used freely, there being two with the traffic and one against it for each 16-ft. panel.

The weights of steel in the superstructure of the different sections of the crossing are as follows: Slough spans, 5,694 tons; east channel spans, 3,214 tons; west channel spans, 3,107 tons; the swing span weighing 2,200 tons. The design and construction of the bridge were done under the direction of E. C. Carter, chief engineer; W. H. Finley, assistant chief engineer, and I. F. Stern, engineer of bridges of the Chicago & North Western. F. H. Bainbridge was resident engineer in charge of the work, and H. M. Spahr, assistant engineer. The contract for the substructure was let to the Foundation Company, New York; for furnishing and erecting the east channel and slough spans, to the Wisconsin Bridge & Iron Co., Milwaukee, Wis.; for furnishing and erecting the west channel spans, to the Pennsylvania Steel Co., Steelton, Pa. The last named sub-let the work of erection to the Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

Besides the main line traffic of the North Western on its



Detail of Expansion Bearing for 202-ft. Span.

Chicago-Omaha line, the bridge is used by the Chicago, Rock Island & Pacific for freignt transfer, and by the Chicago, Burlington & Quincy for its lines from Clinton, Iowa, to Mendota, Ill., and to Savanna, Ill. This traffic is included in the total train movements mentioned earlier in the article.

The west channel spans of the old bridge have been removed. It was the intention at first to retain the east channel portion as a third track, but it was decided later that this would not be desirable and these spans also will be removed.

In connection with the bridge work and other improvements to be made at and in the vicinity of Clinton, a cut-off for through trains is being built on the Illinois side of the river. The location at this point was mentioned in the beginning of the article in referring to the connection between the Chicago, Iowa & Nebraska and the Chicago & Galena Union, a line 2½ miles long up the east bank of the river to Fulton. This right-angled location has been maintained up to the present. The new cut-off forms the hypothenuse of the triangle of which the old line is the other two sides. It is 4.95 miles long and shortens the distance 1.2 miles. All through trains will use it, leaving five trains a day each way over the old line through Fulton.

RAILWAY STATISTICS OF THE UNITED STATES FOR YEAR ENDED JUNE 30, 1908.

The Interstate Commerce Commission in the abstract of its annual report sent to Congress Dec. 24, gives statistics for the year which ended 18 months ago, from which the principal items are shown in the table below. The report for the year before, that ending June 30, 1907, was given in our issue of July 24, 1908. Below the table will be found the explanation of some differences in accounting which need to be borne in mind in comparing one year with another.

Railway Statistics for Years Ending June 30.

	1908.	1907.	1906.	1905.
Miles of road completed	233,678	229,951	224,363	218,101
Increase, 12 months	5,930	5,588	6,262	4,197
*In hands of receivers	.....	3,926	3,971	796
Locomotives, number	57,698	55,388	51,672	48,357
Cars, owned, passenger	45,292	43,973	42,262	40,713
Cars owned, freight	2,100,784	1,991,557	1,837,914	1,731,409
Cars owned, total	2,244,357	2,126,594	1,958,912	1,842,871
Employees	1,458,244	1,672,074	1,521,355	1,382,196
Per 100 miles of road	623	735	689	637
Total stock and funded debt†	$12,840.1	.....	$14,570.4	$13,805.3
Stock and debt per mile road	57,230.0	.....	67,936.0	65,926.0
Gross earnings, millions	2,393.8	$2,589.1	2,325.8	2,082.5
Average per mile	10,533.0	11,383.0	10,460.0	9,598.0
Passengers carried, millions	890.0	873.9	800.0	738.8
Carried 1 mile, millions	29,082.8	27,718.6	25,175.0	23,800.1
Tons freight carried, millions	1,533.0	1,796.3	1,631.4	1,427.7
Carried 1 mile, millions	218,381.5	236,601.4	215,877.6	186,463.1
Av. rate per ton-mile, mills	7.5	7.6	7.5	7.7
Av. pass. fare per mile, cents	2.0	2.0	2.0	2.0

*Not reported in the present abstract. †In millions.

The mileage of road now reported does not include the lines of switching and terminal companies, and the omission of the statistics of these companies also vitiates the comparison in some of the other items. The total length of track owned by switching and terminal companies is 3,712 miles, of which 1,626 is classed as main lines.

In giving the total amount of stock and bonds, the present report gives the sum "outstanding in the hands of the public," which makes a decided reduction from former years; the same is true of the average per mile of road.

The aggregate length of *track* reported June 30, 1908, by the railways of the country was 333,646 miles, an increase of 8,705 miles over the preceding year. This track is owned by 2,161 companies.

Companies (other than switching and terminal) owning 10,143 miles of line, were reorganized, merged or consolidated during the year. The number of locomotives per 1,000 miles of line, excluding those of switching companies, was 246, and the number of cars 9,680. Statistics of power brakes and automatic couplers show substantially all cars and engines equipped, the few exceptions being those of cars or engines probably not used in general service.

In the total of 1,436,275 railway employees other than those in the service of switching and terminal companies, there were 57,688 enginemen, 61,215 firemen, 43,322 conductors, and 114,580 other trainmen.

The total number of railway employees (disregarding a small number not assigned and those employed by switching and terminal companies) was apportioned among the five general divisions of railway employment, as follows: For maintenance of way and structures, 442,936; for maintenance of equipment, 290,608; traffic, 24,817; transportation, 620,584; and general, 53,439.

The report includes summaries showing the average daily compensation of eighteen classes of employees for a series of years, and also the aggregate amount of compensation returned for the several classes. The total amount of wages and salaries reported as paid to railway employees (including those in the service of switching and terminal companies) during the year was $1,051,632,225.

The par value of the total amount of capital outstanding exclusive of (switching and terminal companies), was $16,767,544,827. Of this amount, $12,840,091,462 was outstanding in the hands of the public. Of the total outstanding, there existed as stock $7,373,212,323, of which $5,910,351,430 was common and $1,462,860,893 was preferred; the remaining part, $9,394,332,504 represented funded debt, consisting of mortgage bonds, $6,610,189,953; collateral trust bonds $1,076,670,441; plain bonds, debentures, and notes, $835,551,354; income bonds, $258,584,016; miscellaneous obligations, $268,743,958; and equipment trust obligations, $344,592,782.

Of the total capital stock outstanding, $2,529,841,583, or 34.31 per cent., paid no dividends. The amount of dividends declared during the year was $386,879,362, being equivalent to 7.99 per cent. on dividend-paying stock. For the year ending June 30, 1907, the amount of dividends declared was $308,088,627. The total amount of funded debt (omitting equipment trust obligations) that paid no interest was $655,598,627, or 7.24 per cent. Of mortgage bonds, $487,372,930, or 7.37 per cent.; of collateral trust bonds, $14,119,518, or 1.31 per cent.; of plain bonds, debentures, and notes, $29,314,941; or 3.51 per cent.; of income bonds, $120,424,356, or 46.57 per cent.; and of miscellaneous obligations, $4,366,882, or 1.62 per cent., paid on interest.

The increase in the number of passengers carried 1 mile for 1908 over the corresponding figure for 1907 was 1,400,098,012. The increase in the number of passengers carried 1 mile in 1907 over that for 1906 was 2,551,313,199 passenger-miles. The number of tons of freight shown as carried includes freight received from connections. The decrease in the number of tons carried in 1908 under the corresponding figure for 1907 was 185,460,810. The increase in the number of tons carried in 1907 over the corresponding return for 1906 was 164,962,440 tons. The passenger train revenue per train-mile was $1.27; the freight revenue per train-mile was $2.65. The number of tons carried 1 mile per mile of road, as computed on the basis used for the year ending June 30, 1908, was 974,654 ton-miles. The average cost of running a train 1 mile was $1.47. The ratio of operating expenses to operating revenues was 69.75 per cent. These averages for a number of reasons are not strictly comparable with those published for previous years.

The following figures present the operating revenues in detail:

Freight revenue	$1,655,419,108
Passenger	566,832,746
Mail	48,517,563
Express	58,692,091
Excess baggage and milk (on pass. trains)	12,838,647
Parlor and chair car revenue, etc.	3,480,738
Switching	19,715,089
Special service train revenue and miscel.	7,082,526
Total, operations other than transportation	21,227,481

The operating expenses assigned to the five general classes were:

Maintenance of way and structures	$329,373,367
Maintenance of equipment	368,353,798
Traffic expenses	48,262,758
Transportation expenses	868,252,168
General expenses	55,179,174
Undistributed	126,611
Total	$1,669,547,876

The operating expenses averaged $7,346 per mile of line.

Accidents—Statistics of accidents are given from the annual reports of carriers differing slightly from those contained in the Quarterly Accident Bulletins. Those not shown in the bulletins are summarized as follows: The total number of persons other than employees and passengers killed was 6,402; injured, 10,187. These figures include the casualties to persons trespassing, of whom 5,489 were killed and 5,756 were injured. At highway crossings, killed, 832; injured, 1,755; at stations, killed, 464; injured, 581; at other points along track, killed, 3,665; injured, 2,118.

Returns indicate that in 1908, 1 passenger was killed for every 2,335,983 carried, and 1 injured for every 77,017 carried; 76,332,905 passenger-miles were accomplished for each passenger killed, and 2,516,687 passenger-miles for each passenger injured.

The following summary of revenues and expenses, taken from another part of the commission's abstract, brings the figures down to July 1, 1909. These statements represent the

aggregate of the monthly financial returns made by the railway companies:

Item.	Year ending June 30, 1909. Amount.	Ratio to total operating revenues.	Average per mile of line.a	Year ending June 30, 1908. Amount.	Ratio to total operating revenues.	Average per mile of line.b
		Per cent.			Per cent.	
Freight revenue	$1,682,919,304.82	68.88	$7,222.75	$1,659,055,663.18	68.51	$7,271.30
Passenger revenue	564,302,580.36	23.09	2,421.87	566,245,657.84	23.38	2,481.74
Other transportation revenue	173,634,402.26	7.11	745.20	172,560,040.56	7.13	756.30
Nontransportation revenue	22,455,944.96	.92	38	23,680,643.18	.98	103.79
Total operating revenues	2,443,312,232.40	100.00	10,486.20	2,421,542,004.76	100.00	10,613.13
Less total operating expenses	1,615,497,233.50	66.12	6,933.39	1,687,144,975.74	69.67	7,394.42
Rail operations: Net revenue	827,814,998.90	33.88	3,552.81	734,397,029.02	30.33	3,218.71
Outside operations: Net revenue	4,198,417.87	.....	18.02	5,797,161.11	....	25.41
Total net operating revenue	832,013,416.77	.....	3,570.83	740,194,190.13	.....	3,244.12
Taxes	89,026,226.18	.....	382.08	83,775,869.26	.....	367.17
Operating income	742,987,190.59	.....	3,188.75	656,418,320.87	.....	2,876.95

a On basis of average mileage operated during the year, 233,002.67 miles; mileage operated at end of year, 234,182.70 miles.
b On basis of average mileage operated during the year, 228,164.80 miles; mileage operated at end of year, 229,952.36 miles.

INTERSTATE COMMERCE COMMISSION REPORT.

The annual report of the Interstate Commerce Commission was noticed last week, page 1,273. Following are abstracts of two chapters for which there was not room at that time:

STATISTICS.

The head of the division of statistics and accounts gives a review of his work during the past year, a principal feature of which has been the publication of monthly financial reports, with which our readers are familiar. This bureau is investigating switching and industrial railways, and a special report will soon be published, telling all about these organizations. There are 2,600 of them in the country, of which only about 150 have hitherto reported to the commission. It is proposed to require all of them to make reports, and there is also under consideration a proposal to require all railways to make separate reports of their terminal and switching services.

Under the comprehensive authority of the Twentieth Section of the law, the commission purposes to make special investigations of all sorts of subjects which may affect its action in any case coming before it. The attention of Congress is called to the desirability of securing statistics of traffic by water. Reports are now required from the express companies. Their business is found to be very complicated, and it has been necessary to proceed with great care in this field. The examiners, who make general examinations of carriers' books, and who also make special examinations, made 112 reports during the year, but it has been difficult to secure competent men for this work and to retain them, when secured, against the competitive offers of private corporations. The report ends with the usual abstract of the statistics for the year ending June 30, 1908, which will be found under another head.

SAFETY APPLIANCES.

The chapter on safety appliances makes a plea for the bill, now before Congress, to establish by law standard steps, ladders and hand brakes. This bill was noticed in the *Railroad Age Gazette* of December 24. In this chapter there is a three-page digest of recent decisions of the federal courts on the safety appliance acts. Since the enactment of the law, the government has recovered $140,000 in penalties for violations, and the number of violations represented in the suits which have been prosecuted is 2,692. During the last fiscal year the number of violations charged was 302, of which 36 have gone to trial, and all but four of which have been decided in favor of the government. The inspectors of the commission still find retaining valves which are not kept in good condition, and "a great many" hand brakes are found which work in opposition to the air-brakes. The inspectors have conducted standing tests of air-brakes, from which it is said that much improvement has resulted. Most of the legal questions which have arisen in the application of the safety appliance acts have been satisfactorily settled, except that concerning the responsibility of employees in case they are injured while moving defective cars for the purpose of repair. Such a movement, to be lawful, must be made independently of any movement of vehicles which are commercially employed, and it is doubtful whether, in the movement of such cars, section 8 of the law gives the injured employee any immunity from his common law responsibility for looking out for his own safety.

COMPARATIVE TESTS OF CONSOLIDATION AND MALLET LOCOMOTIVES ON SOUTHERN PACIFIC.

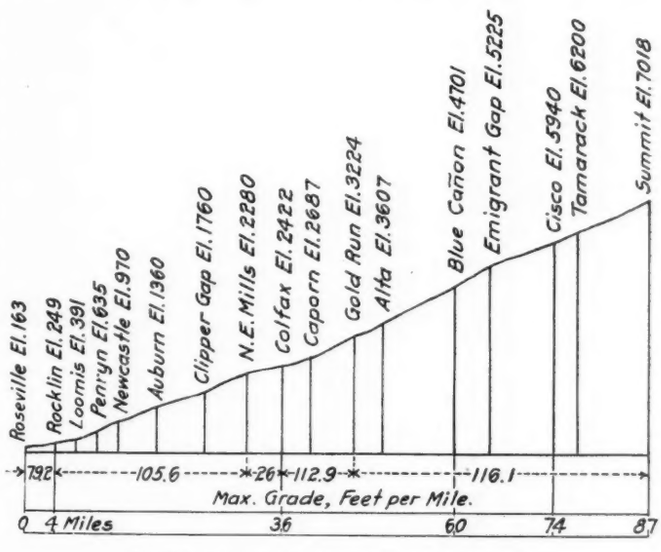
The Mallet freight locomotives built by the Baldwin Locomotive Works for mountain service on the Southern Pacific were fully illustrated in the *Railroad Age Gazette* April 30, 1909, page 933. The engines have compound cylinders 26 in. and 40 in. x 30 in., and the weight on drivers is 394,150 lbs. The consolidation engines have cylinders 22 9/32 in. x 30 in. and weight on drivers 187,000 lbs.

The table below gives other data relating to the two types of engines tested:

TABLE 1.

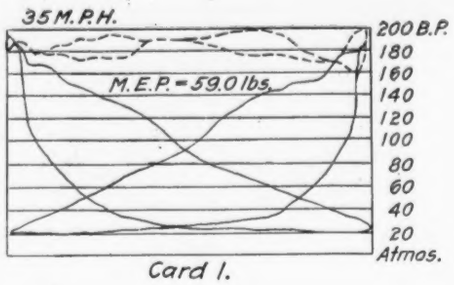
	Mallet.	Consolidat'n.
Engine	No. 4001.	No. 2564.
Size of cylinders	26 & 40 x 30 in.	22 9/32 x30 in.
Diameter of drivers	56⅜ in. h.p., 56¾ in. l.p.	54⅞ in.
Total weight, locomotive	425,900 lbs.	208,000 lbs.
Weight on drivers	394,150 "	187,000 "
Weight of tender	169,765 "	134,745 "
Total boiler heating surface	6,394 sq. ft.	3,403 sq. ft.
Heating surface, feed-water heater	1,221 "	..... "
" " reheater	655 "	..... "
" " branch pipes	..... "	29 "
Diameter of exhaust nozzle	7 in., ⅜ in. rd. split	5 1/16 in.
Kind of burner	3½ in. Von Boden-Ingles.	

The large Mallet locomotives on the Great Northern have 316,000 lbs. on drivers, and they were illustrated in the *Railroad Gazette* of August 17 and October 12, 1906. An account of their performance on mountain grades was presented to the American Society of Mechanical Engineers by G. H. Emerson, superintendent of motive power, and will be found in the Proceedings of that Society, Volume 30 (1908), page 1029.

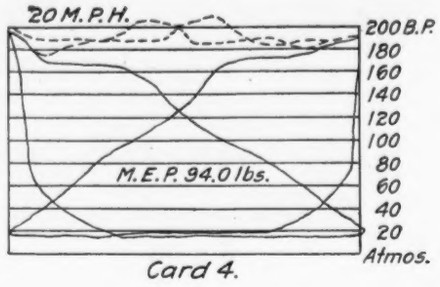


Profile of Road; Roseville to Summit.

The Southern Pacific Mallet engines were tested in November, 1909, and the consolidation in June, 1909, on the Sacramento division, Roseville to Summit, 87 miles. The first half



Card 1.



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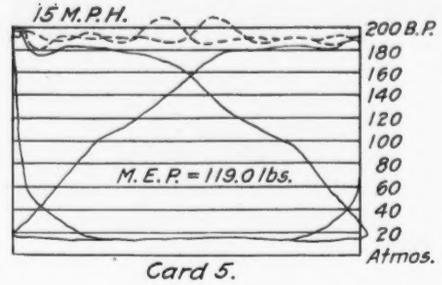


Card 5.

Indicator Diagrams from Engine 2564, Class C-57$\frac{22}{30}$ 187; Baldwin Simple Consolidation, Without Superheater.

Diagrams taken June 9 and 11, 1909, on Sacramento Division, between Roseville and Summit.
Freight train, Extra, East.
Train consisted of 14.5 cars—481 tons—Engine unaided.

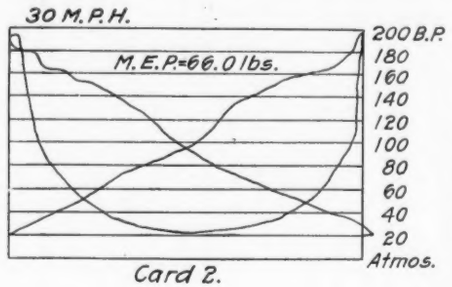
NOTE.—Diagrams taken at working points of cut-off and represent average performance of engine at speeds shown. Cards taken by Crosby indicator, on right cylinder. For chart of fuel consumption, see ML. 1220-21.

Dimensions of cylinder	22$\frac{3}{32}$ in. x 30 in.
Weight of engine, loaded	208,000 lbs.
Weight on drivers	187,000 "
Weight on truck	21,000 "
Diameter of drivers	54⅞ in.
Total heating surface, boiler	3,403 sq. ft.
Heating surface of firebox	177 "
Heating surface of branch pipes	29 "
Diameter of exhaust nozzle	5$\frac{3}{16}$ in.
Engine equipped with valve	Drawing C.A. 2905.
Type of valve, piston	Inside admission
Dimensions of steam ports	1½ in. x 28$\frac{13}{16}$ in.
Dimensions of exhaust ports	3 in. x 28$\frac{13}{16}$ in.
Exhaust lap of valve	$\frac{1}{16}$ in.
Steam lap of valve	1 in.
Lead at full throw	$\frac{3}{32}$ in.

Indicator Spring, 100, *Calibrated*.

NOTE.—Dotted lines on cards are steam chest pressures.

	No. of card						
	1.	2.	3.	4.	5.	7.	8.
Cut-off	11½ in.	10 in.	8½ in.	11½ in.	13½ in.	14½ in.	22½ in.
Revolutions per minute	215	184	153	123	92	61	31
Piston speed, ft. per min.	1,075	920	765	615	460	305	155
Velocity of train, miles per hour	35	30	25	20	15	10	5
Position of throttle	Full.	Full.	Full.	Full.	Full.	Full.	Full.
Boiler pressure	200	200	200	200	200	200	195
M. E. P. in cylinder	59.0	66.0	69.5	94.0	119.0	134.0	168.0
M. E. P. expressed as per cent. of B.P.	29.5	33.0	34.8	47.0	59.5	67.0	86.2
Indicated horse-power	1,470	1,410	1,237	1,339	1,271	954	598
Tractive power	15,762	17,632	18,567	25,112	31,791	35,798	44,881
M. E. P. on crosshead	22,632	25,318	26,660	36,058	45,648	51,402	64,445
Temperature in steam chest, deg. F.	389	387	387	387	387	385	375



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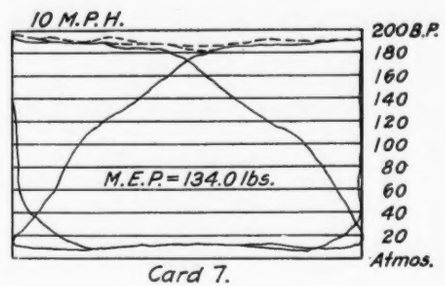

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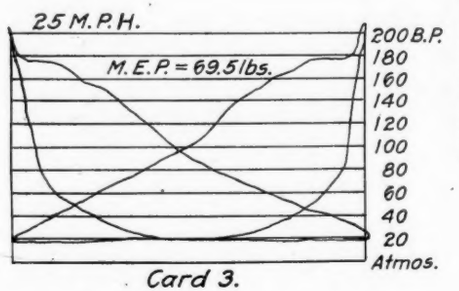

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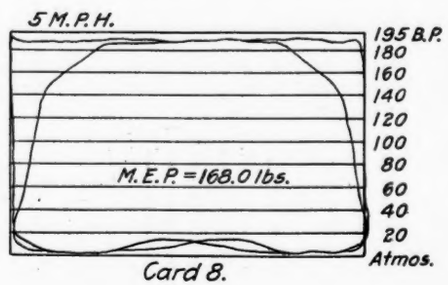

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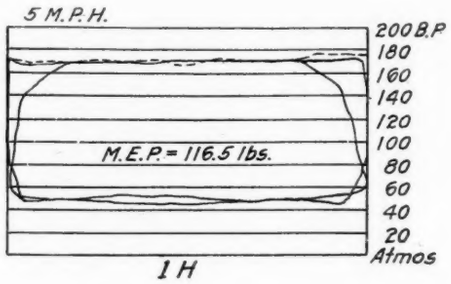
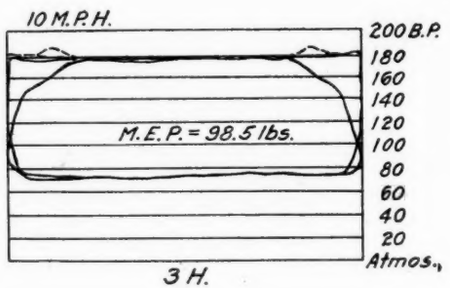
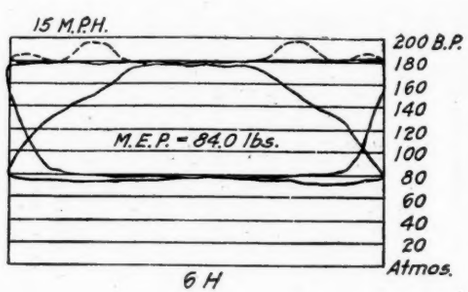


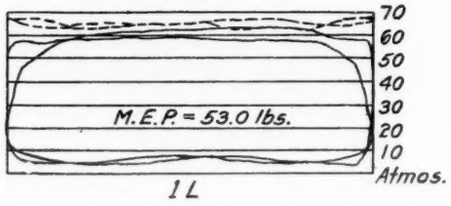
1 H



3 H.



6 H



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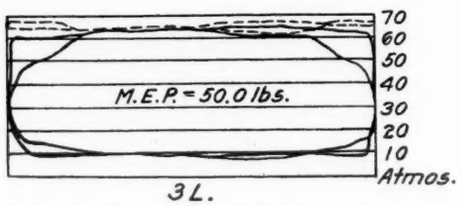

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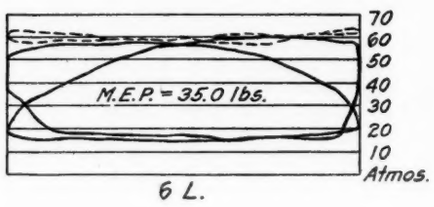


6 L.

Indicator Diagrams from Engine 4001; Baldwin Compound Mallet Consolidation.

Diagrams taken Nov. 8, 1909, on Sacramento Division, between Roseville and Summit.
Train consisted of 21 cars—1,105.5 tons—Engine unaided.

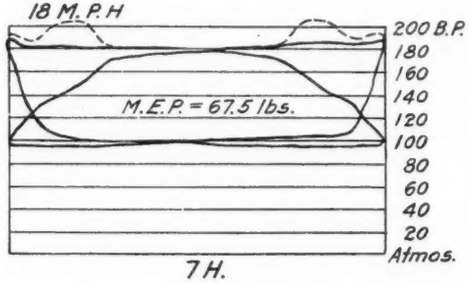
NOTE.—Diagrams taken at working points of cut-off and represent average performance of engine at speeds shown. Cards taken by Crosby indicators on right high and low pressure cylinders. Cards taken on high-pressure engine denoted by H after the card number and those on the low-pressure engine by L. Locomotive equipped with Walschaerts valve motion.

Dimensions of cylinders	26 in. and 40 in. x 30 in.
Weight of engine, loaded	425,900 lbs.
Weight on drivers	394,150 "
Weight on front truck	14,500 "
Weight on trailing truck	17,250 "
Diameter of drivers, h.-p. engine	56⅜ in.
Diameters of drivers, l.-p. engine	56¾ in.
Total heating surface, boiler	6,394 sq. ft.
Heating surface of firebox	232 "
Heating surface of boiler tubes	4,941 "
Heating surface of feedwater heater	1,221 "
Heating surface of reheater	655 "
Diameter of exhaust nozzle	7 in. with ⅜ in. round split
Valve, piston	Inside admission, see drawing C.A. 6859
Dimensions of steam ports	1½ in. x 36⅛ in.
Dimensions of exhaust ports	3 in. x 36⅛ in.
Exhaust lap of valve	1/16 in.
Steam lap of valve	1 in.
Lead at full throw	25/64 in. back, ¼ in. front
Weight of tender, loaded	169,765 lbs.

Indicator Springs, 100 *in High Pressure and* 50 *on Low Pressure Cylinders, Both Calibrated.*

NOTE.—Dotted lines on cards are steam chest pressures.

Number of card	1 H.	1 L.	3 H.	3 L.	6 H.	6 L.	7 H.	7 L.	8 H.	8 L.
Cut-off, ins.	24¾	25	24	24¼	20	18½	21½	21½	15½	17½
Revolutions per minute	29.8	29.6	59.6	59.2	89.4	88.8	107.3	106.6	119.2	118.4
Piston speed, ft. per min.	149	148	298	296	447	444	537	533	596	592
Velocity of train, M. P. H.	5	5	10	10	15	15	18	18	20	20
Position of throttle	Full.	Full.	Full.	Full.	Full.	Full.	Full.	Full.	Full.	Full.
Boiler pressure	200	200	200	200	200	200	200	200	200	200
M. E. P. in cylinder	116.5	53.0	98.5	50.0	84.0	35.0	67.5	33.0	48.5	29.5
M. E. P. expr. as p. ct. B.P.	58.3	26.5	49.3	25.0	42.0	17.5	33.8	16.5	24.3	14.8
Indicated horse-power	552	595	934	1,123	1,194	1,179	1,152	1,334	920	1,325
Total i. h.p. of locomotive		1,147		2,057		2,373		2,486		2,245
Tractive power	41,429	44,626	35,036	42,100	29,879	29,470	24,010	27,786	17,251	24,839
Total t. p. of locomotive		86,055		77,136		59,349		51,796		42,090
Per. ct. of work in cylinder	48	52	45	55	50	50	46	54	41	59
M.E.P. on crosshead	61,122	66,267	51,678	62,516	44,071	43,761	35,416	41,261	25,445	36,884
Temp. l. p. stm. chest, deg. F.		310		312		310		310		310



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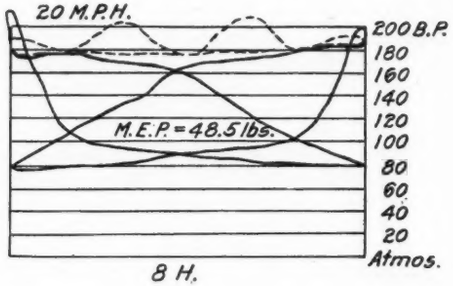

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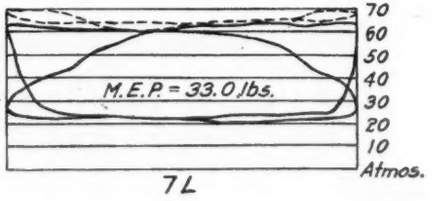

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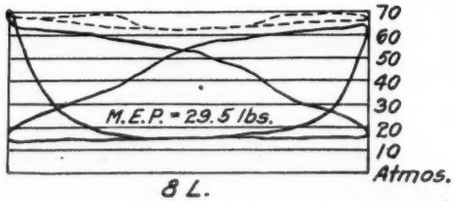


8 L.

of the distance has grades 105 to 113 ft. per mile, and for the last 40 miles the grade is 116 ft. per mile. A diagram showing the profile of the road is here presented. The ratio of the weight on drivers for the two classes of engines was 2.1 to 1, and the average weight of train hauled up the 2.2 per cent. grade was 1,056 tons by tne Mallet and 481 tons by the consolidation engine. The fuel used by each engine was Kern river oil having the following quality: Gravity, 15.8 B; flash point, 230 deg. F.; fire point, 278 deg. F.; weight per gallon, 8 lbs. The comparative cost of operating the locomotive in freight service between Roseville and Summit is given in the table below:

Table 2.

Detail.	Cost per mile in cents—Mallet—Locomotive-mile.	Mallet—100 gross ton-miles.	Consolidation—Locomotive-mile.	Consolidation—100 gross ton-mile.
Repairs, running only	5.67	.53	5.48	1.14
Fuel	47.72	4.52	26.62	5.53
Enginemen	11.95	1.13	10.96	2.28
Lubricating	.85	.07	.43	.09
Water	2.09	.20	1.11	.23
Total	68.28	6.45	44.60	9.27

The relative cost of locomotive expenses as shown above are 70 for the mallet and 100 for the consolidation. The figure for figures are for actual running time, the equivalent in water, of 15 gal. of oil is allowed per hour while standing. In "gallons and pounds of oil per 1,000 ton miles" and "ton miles per pound of oil burned," a deduction is made of 15 gal. per hour while standing and 3.5 per cent. of total oil for use in evaporating steam for atomizing the oil. In "pounds of steam used for air pump, oil burner, etc.," an allowance of 0.2623 lbs. of steam per cycle of air pump and 3.5 per cent. of total steam for use in burner is made. The quantity of oil burned is corrected to normal temperature of 70 deg. F. Steam temperatures were taken every 5 minutes while engines were working steam. One air pump was used on each locomotive.

The main results of the tests show that the equivalent evaporation per pound of fuel was 7.81 per cent.—the ton miles per gallon of water used in main cylinders 14.04 per cent.—the ton miles per pound of coal burned 22.50 per cent.—and the tonnage handled 119.54 per cent. more for the Mallet than the consolidation. The better evaporation effect of the Mallet boiler was doubtless due to the fact that the final temperature of waste gases in the Mallet was 287.2 deg. less than the waste gases of the consolidation locomotive, while the gain in main steam cylinder efficiency is accounted for by the

Table 3.—*Service Tests of Baldwin Compound Mallet Consolidation Freight Locomotive* 4001, *and Common Standard Simple Consolidation Freight Locomotive* 2564, *on Sacramento Division, June and November,* 1909. *Oil Burning. Two Trips with each Engine, from Roseville to Summit.*

	4001 Baldwin, Mallet Compd. 1	4001 Baldwin, Mallet Compd. 2	2564 Baldwin, Simp. Cnsldatn. 1	2564 Baldwin, Simp. Cnsldatn. 2	4001 Mallet Comp. Totals and averages.	2564 Simp. Cons. Totals and averages.
Number of locomotive						
Builder and kind of locomotive						
Number of test						
Location of test	Roseville to Summit.		Roseville to Summit.		Roseville to Summit.	
Date of test	Nov.6, 1909.	Nov. 8, 1909.	June 9, 1909.	June 11, 1909.	Nov.6 & 8,'09	June 9 & 11.
Total time of test	13 h. 52 m.	15 h. 10 m.	10 h. 16 m.	11 h. 7 m.	29 h. 2 m.	21 h. 23 m.
Actual running time	8 h. 47 m.	9 h. 24 m.	6 h. 29 m.	6 h. 30 m.	18 h. 11 m.	12 h. 59 m.
Time lost standing during test	5 h. 5 m.	5 h. 46 m.	3 h. 47 m.	4 h. 37 m.	10 h. 51 m.	8 h. 24 m.
Average running time between terminals, miles per hour	9.91	9.26	13.42	13.39	9.57	13.40
Number of stops made	20	25	17	19	45	36
Maximum steam pressure (gage), lbs	200	200	200	200	200	200
Minimum steam pressure (gage), lbs	175	180	185	175	175	175
Average steam pressure (gage), lbs	194.0	195.0	197.7	194.6	194.5	196.1
Average temperature of steam, high-pressure steam chest	368.7°F.	364.7°F.	383.1°F.	381.3°F.	366.7°F.	382.4°F.
" " " steam, high-pressure exhaust	321.3°F.	324.2°F.	.....	.....	322.7°F.	.....
" " " exh'st st'm after passing through reheater	315.1°F.	319.4°F.	.....	.....	316.9°F.	.....
" " " steam, low-pressure steam chest	304.8°F.	310.5°F.	.....	.....	307.2°F.	.....
" " " smokebox gases	451.3°F.	451.3°F.	727.1°F.	754.7°F.	451.3°F.	738.5°F.
" " " gases in combustion chamber	590.5°F.	590.5°F.	.....	.....	590.5°F.	.....
" " " feed water	53.7°F.	52.6°F.	68.8°F.	68.0°F.	53.2°F.	68.4°F.
" " " water to fd-wtr. htr. (or boiler) frm inj.	203.7°F.	202.6°F.	218.8°F.	218.0°F.	203.2°F.	218.4°F.
" " " water passing from heater to boiler	248.8°F.	247.7°F.	.....	.....	248.3°F.	.....
Rise in temperature of feed-water delivered to boiler from heater	45.1°F.	45.1°F.	.....	.....	45.1°F.	.....
Gallons of water evaporated (total)	43,866	47,221	23,662	24,441	91,087	48,103
Pounds of water evaporated (total)	365,550	393,508	197,183	203,675	759,058	400,858
Gallons of oil burned	3,847.2	3,844.9	2,132.5	2,195.9	7,692.1	4,328.4
Pounds of oil burned	30,778	30,759	17,060	17,567	61,537	34,627
Pounds of water evaporated per pound of oil burned	11.88	12.79	11.56	11.59	12.33	11.58
Equivalent ditto, from and at 212 deg. F	14.48	15.62	13.92	13.97	15.04	13.95
Pounds water evaporated pr sq. ft. of boiler heating surface pr hr	6.381	6.401	8.700	8.917	6.392	8.809
Equivalent ditto, from and at 212 deg. F	7.778	7.816	10.475	10.745	7.798	10.610
Distance run, miles	87	87	87	87	174	174
Engine-miles per 1,000 gallons of oil burned	22.61	22.63	40.80	39.62	22.62	40.20
Engine-miles per 1,000 gallons of water evaporated	1.983	1.842	3.677	3.560	1.910	3,617
Number of loaded cars in train	19.0	21.0	9.0	10.0	20.0	9.5
Number of empty cars in train	9.0	0.0	6.0	4.0	4.5	95.0
Total number of cars in train	28.0	21.0	15.0	14.0	24.5	14.5
Weight of train in miles	2,013,0	2,211.0	955.8	967.4	2,112.0	962.0
Weight of train in tons	1,006.5	1,105.5	477.9	483.7	1,056.0	481.0
Tons hauled per ton on locomotive drivers	5.109	5.612	5.111	5.173	5.360	5.144
Gross-ton mileage	87,566	96,179	41,577	42,082	183,744	83,694
Pounds steam used in main cyldrs., available for hauling tonnage	346,576	373,486	183,903	190,128	720,063	374,031
Equivalent ditto, in gallons of water	41,589	44,818	22,068	22,815	86,407	44,883
Equivalent ditto, gallons per 1,000 tons-miles	474.94	465.99	530.77	542.16	470.26	536.29
Pounds steam used in air pump, oil burner, etc.	18,974	20,022	13,280	13,547	38,996	26,827
Equivalent ditto, in gallons of water	2,276.9	2,402.6	1,593.6	1,625.6	4,679.5	3,219.2
Equivalent ditto, gallons per 1,000 ton-miles	26.00	24.98	38.33	38.63	25.47	38.46
Gallons of water per 1,000 ton-miles (total water used)	500.94	490.97	569.10	580.79	495.73	574.75
Gallons of oil per 1,000 ton-miles	41.53	37.68	48.13	48.71	39.51	48.40
Pounds of oil per 1,000 ton-miles	332.24	301.44	385.04	389.68	316.08	387.20
Boiler efficiency based on 18,500 B. t.u. per lb., of oil and on above totals and averages					78.52%	72.83%

Relative performance, based on above totals and averages, gain of Mallet Compound over Consolidation locomotive: Equivalent evaporation per pound of fuel, 7.81 per cent.; Ton-miles per gallon of water used for main cylinders, 14.04 per cent.; Ton-miles per pound of oil burned, 22.50 per cent.; Tonnage hauled, 119.54 per cent.

running repairs for the Mallet is too low for a fair average, as the engine was comparatively new.

Table 3 shows the results obtained from service tests of the two locomotives for two trips each, for hill work only. The water and fuel were carefully measured, and the record of temperature measurements of the water, steam and gases is particularly interesting. The locomotives were handled by regular crews. The train weights are for the distance hauled and are exclusive of engine and tender but include caboose. No helper engine was used during the tests. In "water evaporated per square foot of heating surface per hour" the principle of compounding the locomotive, as compared with the simple consolidation.

The British Congo sections of the Cape-to-Cairo Railway have been formally opened. This completes a continuous British line of 2,147 miles from Cape Town. The section now opened is 134 miles from the Chartered Company's terminus at Broken Hill to the southern frontier of the Congo Independent State. Work is already in progress across the frontier on 160 miles of Congo line into Kantanga, which it is expected will be completed in the autumn of 1910.

TRANSPORTATION AND TRAFFIC IN GERMANY.

BY LOGAN G. MCPHERSON,
Traffic Expert with National Waterways Commission in Europe.

The Empire of Germany occupies an area about equal to that of the states adjoining the Atlantic seaboard from Maine to Virginia. Prussia occupies an extent equivalent to that of the states of New York, New Jersey, Pennsylvania, Maryland and part of the Virginias; that is, an area very nearly the same as that traversed by the railways embraced in the Trunk Line Association, which are designated as Group II by the Interstate Commerce Commission.

To the north the empire fronts on the North sea, into which from sources far in the interior, with their course in Germany, pour the Elbe and the Weser; and on the Baltic sea, to which is tributary the Oder and the Vistula, a broad but little used stream whose source and mouth are in Russia. The Rhine, which moves a greater traffic than any other river in Europe, flows for the most part through Germany, but finds its outlet through Holland in the North sea. To the west, the south and the east Germany has no direct water outlet, but is bounded by lands occupied by nations with whom it has at various times been at war, and with whom it now either maintains an armed peace or an alliance, as with Austria. Through traffic in any considerable volume between Germany and these adjoining nations is a development of but recent years, and is subject to the customs duties at the various frontiers. An understanding of the traffic of the German Empire must, therefore, be approached through a study of the traffic status as it exists within the empire. To an extent this has been determined by the political and economic development whose roots are in the Middle Ages.

During the feudal period fortresses were erected to guard mountain passes, or fords of streams and at other place of strategic importance. Around these fortresses grew settlements that received supplies of food from the feudal dependents within a small area. Similar settlements arose near the monasteries and other establishments of the church and were likewise supplied by the peasants within a limited range. As handicraft developed it was by the work of the artisans at these settlements; their products were used almost entirely by the dependents of the feudal baron or of a monastery, there being little or no traffic betwen one of these small political entities and another. Throughout the centuries of conflict, as smaller feudal areas were absorbed into a duchy or a principality, such progress as there was in handicraft continued to be that of the local artisan whose raw material did not come from far and whose products did not find a distant sale. That is, the traffic of Germany was local traffic, and the effect of this traditional local traffic is apparent at present in the interior of the empire, where the house trades are still a considerable factor in industry, and in that the average distance over which rail traffic is carried in Prussia is but 71 miles, which is less than one-third of the average haul of 244 miles in the United States.

As the medieval merchants, however, gained that ascendency which made them to an extent independent of the feudal overlords, alliances of different cities were formed, of which the Hanseatic league is the type. The cities of these leagues, with but few exceptions, were on the waterways, which provided channels of communication subject to comparatively slight interruptions from physical obstacles. The one conspicuous trading center that was not located on a waterway was the city of Nuremberg, which focused the land ways from the Mediterranean and made tributary a large region of what is now inland Germany. These land ways, over which its traffic was conducted, were principally the old Roman roads which were maintained during the period of the Holy Roman Empire chiefly for the conveyance of passengers and the post. The merchandise traffic, of which Nuremberg was a center, was largely in luxuries from the Mediterranean and the Orient which did not move in great volume and were used only by the wealthy and the powerful. Indeed, prior to the nineteenth century traffic was in but small quantities, not conducing to the benefit of the masses of the people. It yielded profits not infrequently of from 200 per cent. to 300 per cent. and sometimes of 1,500 per cent., but it was also subject to great losses from marauding highwaymen.

The petty states of what is now the German Empire existed in a condition of mutual hostility which often found expression in armed conflict and was always marked by customs reprisals. This condition affected transportation by water as well as by land. Even in the latter part of the eighteenth century everyone who navigated the Elbe from Hamburg to Madgeburg paid toll 14 times, and along the short reach of the Maine from Hamburg to Mayence were 33 toll stations. Even more hindering than the demand for toll was the loss of time incurred because of traffic often being tied up for hours at a time at these little stations. Cologne even demanded that all passing traffic be unloaded on its wharves and loaded again, that the city might obtain the fullest tribute. A lock is said to have been built at Amsterdam in 1220, and there is definite record of the building of locks in the middle and the fifteenth century. In the middle of the eighteenth century the rivers in what is now the heart of Prussia were connected by canals, which, however, were small and insignificant, being constructed mainly to compete with the land roads for the transport of the short-distance traffic. The imposts placed upon the river traffic by the petty states and municipalities became so burdensome that they led to mutual concessions between one state and another, which finally resulted in the abolition of such exactions. Thus in the early part of the nineteenth century the Rhine became the first great commercial thoroughfare, not only of Germany but of Europe, and tolls on the boats using its waters were forbidden by international conventions.

From 1822 to 1840 2,236 kilometers of new canals were built, among them the important connection of the Rhine and the Rhone in Burgundy. The waterways were, therefore, prior to the introduction of steam railways, the main reliance of the German people for communication. Such artificial waterways as were constructed were for the purpose of connecting the natural waterways. Even at the present time by far the greater extent of the German waterways is of the rivers to whose improvement has been devoted much the greater portion of the expenditure. Of the total length of the inland waterways specified in the government's reports as 8,750 miles 5,041 miles are main streams, 885 miles channeled rivers, 1,369 miles navigable canals and 1,443 miles canals and other connecting waterways between lakes, estuaries, etc. The existing canals in greatest measure serve as such connecting waterways. Exceptions are the Dortmund-Ems canal, built to connect the Rhine with Emden, a German seaport, and the canal projected from western to eastern Prussia, whose extension beyond Hanover has been prevented by the antagonism of the agrarian landlords of the east.

Wooden railways have been used in the Harz district for 500 years, but the building of steam railways in Germany did not begin until their construction was well under way both in England and the United States. The first lines were built to connect towns between which there was no water communication, such as Dresden and Leipzig, Brunswick and Wolfenbuettel, and the early development of the main lines of the railways was in this easterly and westerly direction in the interior. It seems probable that they were built at first in large part to meet the needs of passenger traffic, this accounting for the construction of the railways parallel to the Rhine. As the railways were, however, extended from place to place, interlacing throughout the various states of what is now the German Empire, their freight traffic increased.

The first railways in Prussia were built by private companies, the state being unable to raise large funds for railway construction. Later the government granted concessions to private companies, to whom it sometimes extended aid by the

direct purchase of shares and the guarantee of interest. All such concessions provided that the state could take over the lines at will. About 1850 when larger funds were available, the state undertook the operation of a number of lines that had become bankrupt, and entered upon the construction of a number to serve for strategical as well as commercial purposes. In some of the other German states the railways were built and operated by the government, in others by private companies, while in still others were both state-owned and privately-owned companies.

The tariffs were adjusted from the beginning to meet commercial conditions; that is, rates were made to secure traffic. The railways soon became so efficient in this respect that it was the commonly expressed sentiment that they were destined to supersede the waterways. The making of rates to secure traffic, however, brought about the same discriminations that have been the source of bitter complaint in the United States. Lower rates were charged for the long than for the short haul; lower rates were accorded to large shippers than to small; rates varied for different commodities and for one consideration and another. About 1875 there became rampant in Germany the cry that the railways were throttling the waterways which were the natural channels of communication and that the development and the protection of the waterways was the only safeguard from railway monopoly. Thereupon expenditures were resumed upon the improvement of the rivers and the canals.

Because of the different regulations under which railway transportation was conducted in the different states and the complications of their various tariffs, the traffic of the Empire fell into a seemingly inextricable confusion. A committee of investigation reported that "economic considerations point to the conclusion that all railways should be under the control of the state." Prince Bismarck formed a plan for the purchase of all the railways by the Empire, but to this project several of the states offered such strong opposition that it was abandoned. Bismarck, however, extended by the state the purchase of the railways of Prussia and in 1880, under a previously adopted resolution of the Prussian Diet, the policy of securing entire control was formally inaugurated and within ten years it was practically completed. Prussia not only acquired substantially all of the main railway lines within that state, but gained control of the principal routes in North Germany, even when they extended beyond the Prussian boundaries, thereby gaining that dominant influence over the railway policy of the entire Empire which it still exercises.

The tariffs were remodelled in accordance with popular desire into a system whose rigidity it was quickly found was impeding not only the traffic of the railways but hindering commerce. So many exceptions were made to the tariffs that before long they had apparently relapsed into the condition that during the preceding period had been characterized as chaotic. This led to a further revision, to the adoption of the present system which is a compromise between a strict distance tariff and a tariff to meet commercial needs.

The general tariff scheme of Prussia is in two divisions, the first including piece-goods, i.e., merchandise in lots of less than five tons, which is the minimum upon which a "carload" rate is granted; the second "carloads" of five and ten tons. The first divsion has four classes; the first includes piece-goods in general at fast service taking the highest tariff which is upon a tapering basis up to 500 kilometers or 310 miles, and upon a fixed kilometric basis beyond; the second includes certain perishable foodstuffs, plants, etc., whether they move in less than carloads or carloads, being in this respect an exception to the rule applying to the division; the third includes merchandise in general in less than carload lots. The tariff for the second class and the third class is exactly the same, being one-half that of the first class, that is, it is on a tapering basis at one-half the specified first class rate up to 500 kilometers and upon a fixed kilometric basis, one-half of that for the first class, for greater distances. Shipments of the second class, however, have the fast service and those of the thrd class, ordinary or slow service. The fourth class includes certain exceptions to the third class, mainly heavy and staple merchandise, which are carried at a fixed rate per kilometer up to 726 kilometers or 450 miles, and at a lower fixed rate per kilometer for greater distances. Up to 300 kilometers this rate for the fourth class is less than for the third, from 300 to 400 kilometers it is the same, from 400 to 726 kilometers it is higher and for greater distances it is the same. The first division may be summarized as composed of (1) General Fast Piece-Goods; (2) Specified Fast Piece-Goods; (3) General Slow Piece-Goods; (4) Specified Slow Piece-Goods.

The second division is composed of Class A 1 covering five-ton shipments of general merchandise at a fixed rate of 6.7 pfennigs per ton per kilometer; Class B covering ten-ton shipments of general merchandise at a fixed rate of 6 pfennigs per ton per kilometer; Classes I. and II. covering ten-ton shipments of certain heavy or staple merchandise at fixed rates per ton per kilometer of 4.5 and 3.5 pfennigs, respectively; Class A 2 covering five-ton shipments, at a fixed rate of 5 pfennigs per ton per kilometer, of such articles as are designated in Classes I. and II., and Class III. sometimes designated as the "Raw Materials" tariff, but which has been extended to include various other things. The rate is 2.6 pf. per ton per kilometer up to 100 kilometers and 2.2 pf. for greater distances.

There is an express tariff covering shipments which take precedence of the fast goods at double the ordinary fast goods rate for piece-goods and four times the ordinary carload rate for carload shipments. The parcels post provides for the shipment of parcels up to 50 kilogrammes or 110 lbs. in weight.

For all shipments by freight of whatever kind or class there is in addition to the transportation charge which has been indicated a terminal charge which varies with the dstance over which the shipment is to be carried.

Comparatively simple or comparatively complex according to the point of view as this general tariff scheme may seem, it has not been nearly adequate to meet the needs of the German rail traffic. "Ausnahme" corresponding broadly to what in the United States are known as "commodity" tariffs have been adopted to protect the German ports in competition with those of other nations, particularly to secure traffic through Bremen and Hamburg in competition with Rotterdam and Antwerp; to enable the German manufacturers to hold their own in foreign markets and in a general way to develop industry. Such "Ausnahme" tariffs have been applied to so many commodities, the fuels, ores, wood, oils and other raw materials as well as to iron and steel articles that from sixty to seventy per cent. of the traffic of Germany now moves upon such tariffs. Far lower rates are made upon export and upon much of import than upon local traffic and lower rates upon much of the traffic that crosses Germany from one foreign nation to another. Notwithstanding this prominent business men of Germany say that instead of industry and commerce molding the railway freight rates this industry and commerce has been obliged to adjust itself to the freight rates. This finds substantiation in the fact that the "Ausnahme" tariffs do not as a rule apply to finished products in the interior or intra-national traffic, and that there is not a great deal of flexibility in the general tariff scheme. There do not exist in Germany such concessions as milling-in-transit and reconsignment, privileges which the railways of the United States have extended beyond reason. The ministry contends, however, that through the investigation and upon the recommendation of the advisory councils, it adjusts rates in the public interest. Certan it is that the discovery soon made by Bismarck—if indeed it had not been evident to his mind when he promoted the policy of state control—that the net earnings of the railways afforded a handsome addition to the state revenue has been utilized throughout the subsequent

years in the enhancement of the national exchequer. Competition between the railways of the German states is avoided by pooling agreements, and such agreements are also entered into between the German and other governments as to the routing of certain international traffic.

The passenger tariffs are upon a fixed kilometric basis for each of the four classes with an additional charge for passage upon express trains which, however, cannot be availed of by fourth-class passengers. Hand baggage only is carried free. A fee varying with weight and distance is charged for all that is forwarded in baggage cars. Until within recent years return tickets were sold at a reduction from the price of two one-way tickets, the one-way fare being made half the prior round trip rate and at the same time the additional payment for a seat on an express train was abolished. Coincidentally with this, however, the government imposed a tax upon all tickets and inaugurated the charge upon all luggage. The result of this has been on the whole to make travelling dearer. Passengers have therefore travelled in a lower class than formerly, the receipts from the ticket tax during 1906 being three and a quarter million dollars less than estimated.

In Germany at the present time exist side by side these two instrumentalties for freight transportation, a system of waterways navigable in practice for about 10,000 kilometers, or about 6,200 miles, which, of course, does not include the sea frontage, and a system of railways extending over 58,040 kilometers, or about 39,000 miles. How well this dual system of transportation meets the industrial and commercial needs of the Empire can only be judged by a survey of what constitutes that industry and traffic, what are the sources of supply, the places of manufacture and the markets.

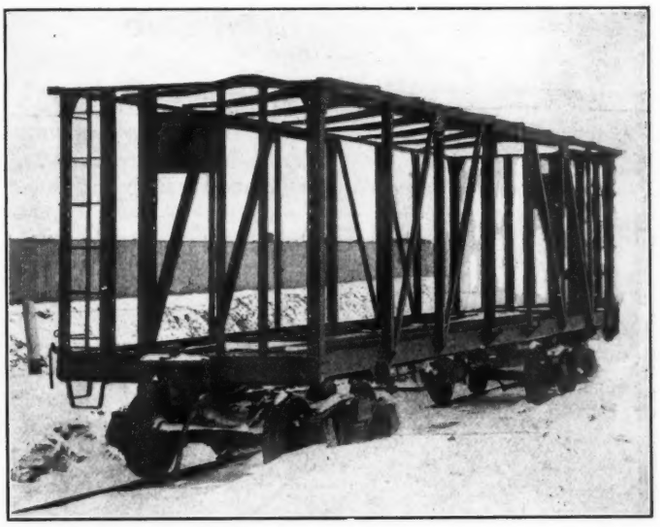
The import and export traffic of Germany moves chiefly through the German ports of Hamburg and Bremen, which are near the mouths of the Elbe and the Weser, through the Dutch port of Rotterdam at the mouth of the Rhine and a portion through Antwerp. Hamburg and Bremen are so similarly situated that each bears about the same commercial relation to the remainder of the Empire as the other. Amsterdam and Antwerp are in similar relation, as also are Duesseldorf and Cologne on the Rhine, which are practically seaports, small steamboats running direct from Cologne to England, as well as between Cologne, Hamburg and other ports of the North and Baltic seas. The Rhine, because of its course through a productive region, because it forms part of the short and direct route therefrom to the ports of England and the North sea, and because of its great navigable capacity early attracted a large share of traffic.

(To be continued.)

STEEL FRAME BOX CAR FOR THE CANADIAN PACIFIC.

The Dominion Car & Foundry Co., Montreal, Que., recently built 500 steel box cars for the Canadian Pacific. These cars differ materially from the usual type of box cars, in that the framing, including the carlines, is of steel and sheathed on the inside with a single course of 1¾-in. lining. This lining is bolted to the members of the steel frame with ½-in. bolts, the holes for which are slotted to provide for shrinkage. Cracks which develop between the planks are pulled together by means of a strap rod, which hooks over the top board and extends through the steel side sill. The lining extends up and overlaps the side plate about 3 in., so that the boards may be drawn down this amount, providing for all possible requirements.

The underframes of these cars are of the usual design, consisting of standard 15-in. channels with ¼-in. cover plates,



Steel Framing of Canadian Pacific Box Car.

Canadian Pacific Steel Frame Box Car.

the side sills being 8-in. and the end sills 10-in. channels. The bolsters and cross bearers are of the built-up type with pressed diaphragms and top and bottom cover plates. The floor supports are composed of Z-bars, the floor being bolted to them.

The framing is clearly shown in the illustration. The side members are made of standard 3-in. Z-bars and the corner posts are 5-in. x 5-in. angle iron. The end framing is of unusually strong design, the two center posts being composed of 4-in. and the intermediate posts of 3-in. Z-bars, which are securely riveted to the end sills. To these posts is bolted the 1¾-in. lining, the whole making an unusually strong construction. Chicago-Winslow improved roofs made by the Chicago-Cleveland Car Roofing Co., Chicago, are used.

These cars are particularly adapted for carrying grain, as the inside lining presents a very smooth surface. The cars are built to conform to the standard dimensions of the American Railway Association, being 36 ft. long, inside, 8 ft. 6 in. wide and 8 ft. high, with a 5-ft. door opening.

During their service the cars have been very carefully watched by officers of the road, and they have undoubtedly given very satisfactory service, since a duplicate order for 1,000 cars has recently been placed with the same builders.

THE RAILWAY SITUATION IN CANADA.

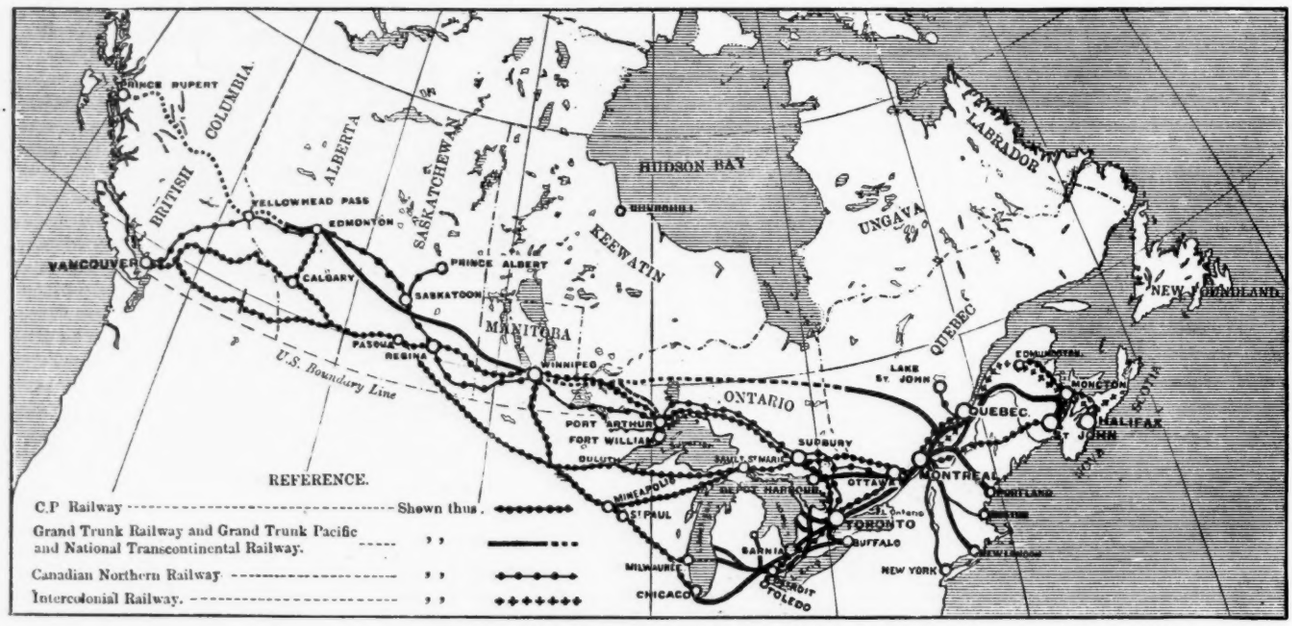
BY J. L. PAYNE,
Comptroller; Department of Railways and Canals.

Canada occupies a unique position among the nations in respect to railways. It has the largest mileage, measured by population; and the smallest mileage, measured by territory.* To hold the former place tells a tale of effort, faith and sacrifices. To be in the latter, suggests the almost boundless field for expansion which must for generations appeal to the energies and resources of the Canadian people.

No other nation has more courageously faced the problem of providing transportation facilities. No other nation has more cheerfully assumed the financial burdens attaching thereto. Out of the Federal treasury $135,549,987 has been paid in direct subventions, the various provinces have contributed $35,588,526, and the municipalities have given $17,825,823. This relatively large sum, however, does not represent half the aid, concrete and otherwise, given toward railway construction. The Dominion and provincial governments have built, and now operate, 2,039 miles of line, at a capital cost of $111,545,903. The Federal government is constructing the eastern section of the Grand Trunk Pacific, the estimated cost of which is $125,000,000. All these expenditures make a total of $425,510,239; or the equivalent of $60 per head for every man, woman and child in the Dominion.

Yet that is not all. The Dominion and the provinces have given 55,116,017 acres of land by way of aid to railways. The money value of these grants cannot be calculated, for obvious reasons; but some notion of the sum they represent may be gathered from the fact that the Canadian Pacific last year sold 376,046 acres at an average price of $13.52 per acre. Ten years ago the selling figure was less than $4. The company still holds 13,000,000 acres; while the Canadian Northern has about 4,000,000. It might safely be estimated that the assistance given in this form will, all told, yield an aggregate of $250,000,000 to the railways which received it. But, of course, the alienation of this vast area of land has not directly involved any loss to the public treasury. The land was comparatively valueless without railways.

Public opinion has been steadily gaining strength in an attitude of hostility to cash subsidies. From 1882 to 1896, practically every railway constructed was given a subsidy of $3,200 per mile, or so many acres of land. When the present Liberal administration took office the policy of giving land grants was discontinued. The money aid, however, was increased from $3,200 per mile to $6,400, under certain prescribed conditions intended to encourage the building of a better class of lines. Up to a cost of $15,000 per mile the government now contributes $3,200 per mile, and 50 per cent. of the cost over $15,000 is allowed up to $6,400 per mile. In other words, the full subsidy of $6,400 would be earned on a road costing $21,400 per mile. The money in all such cases must be specifically voted by Parliament. In recent years, however, the plan of guaranteeing bonds has, to a large extent, taken the place of cash aid, thus creating a liability without any immediate drain on the public treasury. This policy has been applied to the Grand Trunk Pacific and to the Canadian Northern in the west. The outstanding guarantees by the Dominion and provincial governments are at this moment not less than $100,000,000, and engagements have been entered into for at least an equal sum. So that, adding together cash subsidies, land grants and guarantees, a grand total of $875,000,000 is had. For a people numbering at this time 7,500,000, this must be regarded as demonstrating in a substantial way



The Principal Railways of Canada.

*South Australia and West Australia both exceed Canada in these respects.—Editor.

their appreciation of railways as a basic factor in nation building, and their sublime faith in their heritage and themselves.

The railway mileage of Canada was increased by 1,138 miles during the year ended 30th June last.* This brought the total up to 24,104, or about a thousand miles more than that of Great Britain. There is this vast difference, however, in the comparison: While Great Britain has a population of 1,912 to each mile of railway and 19.0 miles of line for each 100 square miles of territory, Canada has but 296 persons to each railway mile and 0.6 mile for each 100 square miles of her area. The United States has 365 persons for each mile of railway, and 6.4 miles of line for each square mile of territory. At the close of the Canadian railway year there were between 3,000 and 3,600 miles under actual construction, at least 1,000 miles of which will be in operation by midsummer of 1910. In the following year the Grand Trunk Pacific is expected to be available for traffic from Moncton, New Brunswick, to Edmonton, Alberta. Meanwhile the mountain section of that line will be pushed to completion, and the Pacific Coast division of the Canadian Northern will be well under way. Canada will, when these undertakings are completed, then have three trans-continental railways.

Up to 1885 there were but a few miles of railway west of Lake Huron. Now there are 10,000 miles in the western provinces, and for some time to come construction work will be chiefly on the prairies and in British Columbia. In the latter Province a general election recently took place on the issue as to whether or not a guarantee of bonds amounting to $23,000,000 should be given to the Canadian Northern. The fact that only three opponents of this measure were elected fairly indicates the strength of western sentiment in favor of railways. Alberta and Saskatchewan were given local autonomy four years ago, yet their guarantees to railways already run into many millions. The West is filling up rapidly, and the majority of settlers appear to constitute an overflow from the United States. Up to ten or fifteen years ago the migration was in the opposite direction. The lure of the world's last area of free or cheap land is, however, irresistible, and it seems not improbable that as a r esult the great plains lying to the north of the 49th parallel must within the next generation be the home of millions of producers. For them, next to the primary and basic necessaries of life, transportation is essential. The dollars and cents aspect of the matter leaves no room for debate on the score of expediency. When the Canadian Pacific was projected in 1881, many able men in Parliament predicted that it would never earn grease for its wheels. To-day it is one of the most prosperous railways in the world.

The capital liability of Canadian railways was increased by $69,186,403 in 1909, bringing the total up to $1,308,481,416. Stocks amounted to $647,534,647, and funded debt to $660,946,769. Jointly, these represent an average of $55,638 per mile of line. These figures do not, of course, include the cost nor mileage of lines owned and operated by government. Next year, however, the capital obligations of railways will be reduced. The basis of computation has not up to this time been sound, and in Canada a revision is in progress along lines similar to those being followed by the Interstate Commerce Commission at Washington. That is to say, an effort is being made to winnow the live capital from that which is dead. The actual extinction of stock and bond liability has been proceeding for years from two causes in chief—the purchase of smaller lines by the larger, and the reconstruction of corporate obligations by process of law. In the former case, the purchasing company pays for the franchise of the selling company by the issue of stock and bonds of its own, thus creating duplication. In the second instance, the order of the court is met by an issue of stocks and bonds by the new owners. Here, as at Washington, it has been the practice to retain in the records of railways the original capital statements, plus all new liabilities under that head. This was sound from the historical point of view; but it was bad bookkeeping. The time is opportune for a recasting of our official capital statement, and the work is under way.

The public service of railways within the Dominion is shown in the carrying of 32,683,309 passengers and 66,842,258 tons of freight during 1909. There was a decrease of 1,361,683 in the number of passengers, and an increase of 3,771,091 in the freight tonnage. By all the ordinary tests, the passenger business of 1909 was unsatisfactory from the standpoint of the railways; for while there was a falling off in earnings, the train mileage and additions to equipment reveal a substantially better passenger service. In a year of abounding prosperity this result is quite unaccountable. On the other hand, the freight traffic of the country exhibited marked expansion. In 1908 there had been a loss of 794,968 tons. This decline was not only recovered, but a new record was established. The following summary of traffic statistics may be helpful in this relation:

	1908.	1909.
Miles of railway	22,966	24,104
Passengers	34,044,992	32,683,309
Passenger density	90,654	84,342
Average passenger journey, miles	61	62
Average passengers, per train	54	51
Passenger train mileage	31,950,349	32,295,730
Av. receipts per pass., per mile, cents.	1.920	1.921
Tons of freight	63,071,167	66,842,258
Tons hauled 1 mile	12,961,512,519	13,160,567,550
Freight density	564,374	545,991
Average haul	206	197
Freight train mileage	40,476,370	40,304,906
Mixed train mileage	6,210,807	7,061,580
Average tons per train	278	278
" cars per train	16.04	16.37
" tons per car	17.33	16.98
Receipts per ton per mile, cents	.723	.727

It may be instructive to point out that the products of agriculture, animals, mines and forests, representing what is regarded as low rate freight, constituted 75.28 per cent. of the whole traffic for 1909. This ratio is practically identical with that which prevailed on the railways of the United States in 1908.

The gross earnings in 1909 amounted to $145,056,336—a decrease of $1,861,977 as compared with the preceding year. Nevertheless, a reduction of $2,704,058 in operating expenses left the net revenue $40,456,252, or $842,080 more than for 1908. The ratio of operating expenses to gross earnings was 72.11. The net earnings were equal to 3.09 per cent. on the total capitalization, to which allusion has been made; but, if the liability of those lines which are only nominally commercial in character were eliminated, and only live capital were included in the equation, the dividend earning power of Canadian railways would be shown to have been considerably higher. Freight service yielded $96,685,076 and passenger service $45,282,326, the former being 66.65 of the total earnings and the latter 31.21. Further information with respect to earnings might be epitomized as follows:

	1908.	1909.
Gross earnings per mile	$6,389.37	$6.017.89
Net earnings per mile	1,724.90	1,678.40
Earnings per passenger	1.175	1.195
" per ton	1.486	1.432
" passenger train mile	1.228	1.150
" freight train mile	2.008	2.041

Operating expenses were $104,600,084, as against $107,304,143 in 1908. The cost of running a train one mile was reduced from $1,364 in 1908 to $1,309. It will be seen from the following distribution of operating expenses that the saving effected in 1909 was not due to economies relating to the upkeep of either way and structures or equipment:

	1908.	1909.
Way and structures	$20,778,610	$21,153,274
Equipment	20,273,626	21,510,304
Traffic	.....	3,798,824
Transportation	62,486,270	54,284,587
General expenses	3,765,636	3,853,094

The new classification, which is identical with that of the Interstate Commerce Commission in everything except the deduction for depreciation, introduced traffic expenses for the first time, and thus disturbed the basis of comparison with

*The *Railway Age Gazette* compilation shows that 1,488 miles were built during the calendar year, 1909.

preceding years. The items in that division are, however, taken almost wholly from transportation. It will be seen that the lowered operating expenses were the result of reductions in the cost of conducting transportation. An analysis of the whole expense account reveals the following important percentages: Railway and track 8.09, locomotive repairs 9.01, freight car repairs 5.63, station employees 6.83, road enginemen 6.02, fuel for road locomotives 15.40 and road trainmen 6.29. Since all railway operations turn upon the running of trains, it is significant that within ten years the cost in Canada of running a train one mile has increased from $.664 to $1.309—equal to 51.5 per cent.

The additions to equipment in 1909 were on a modest scale, amounting to 97 locomotives, 2,070 freight cars and 166 passenger cars. These relatively small increases were due to causes which were continental in their sweep. Following in disturbed condition of trade in 1907, two things happened in 1908—large additions to rolling stock and a decline in freight traffic. In that year the largest car surplus in the history of the Dominion was accumulated. Under such circumstances it would have been unreasonable to look for any considerable augmentations to equipment in 1909. The total number of locomotives on 30th June last was 3,969, of freight cars 117,779 and of passenger cars 4,192, representing for each 1,000 miles of line 165 locomotives and 4,887 freight cars. Few cars are now imported from the United States, but the purchase of parts constitutes a substantial item of international trade. During the fiscal year ended 31st March last Canada purchased 113 locomotives from the United States, at a cost of $386,000.

Train mileage increased 1,024,690 during 1909, making a total of 79,662,216. This additional mileage related almost wholly to mixed train service. For some reason, possibly an approach toward regular passenger service on smaller lines, this class of mileage has increased from 5,971,414 in 1907 to 7,061,580 in 1909. During the seven years preceding 1907 there had been decreases. The mileage of revenue freight trains represented 50.59 per cent. of the aggregate. Loaded freight cars had a mileage of 775,543,414, showing an increase of 26,618,594 over 1908. The locomotive mileage was 97,865,325, to perform which 6,832,108 tons of coal were consumed at a total cost of $17,544,449. The cost of fuel per 100 miles by the various classes of locomotives was: Freight $22.65, passenger $14.45, mixed $14.51, switching $12.82 and construction $10.59. The average cost of coal in 1909 was $2.56 per ton.

Railway accidents in 1909 led to the loss of 478 lives and injury to 1,404 persons. Of the killed 36 were passengers, 182 employees, 190 trespassers and 70 classified as other persons. Among the injured were 281 passengers, 897 employees, 95 trespassers, 89 non-trespassers, 25 postal clerks and expressmen and 17 other persons. Collisions caused the death of 6 passengers and 40 employees, while from the same cause 83 passengers and 86 employees were injured. Notwithstanding the almost universal use of automatic devices, 18 employees were killed and 125 injured in coupling and uncoupling cars.

The question of safety at highway crossings comes up perennially in Parliament, and within recent years an organized movement has taken place to reduce the number of level intersections. This year, for the first time, statistics were gathered bearing on the subject. It was found there were in the Dominion 18,272 highway crossings, of which 15,918 were rural and 2,353 urban. Of the rural crossings 492 were protected, and of the urban 587. The protection took the following forms:

	Rural.	Urban.
Gates	34	133
Overhead bridges	190	110
Subways	213	166
Bells	39	77
Watchmen	16	101

Crossing accidents in 1909 accounted for the killing of 76 persons and the injury of 72. Of these victims 33 were killed and 41 injured at urban crossings, and 43 killed and 31 injured at rural crossings. Strange to say, however, the record for the past three years shows that more than half the fatal accidents in cities and towns were at protected crossings. No means seems yet to have been devised to keep venturesome pedestrians from disregarding the gates and attempting to get over crossings in the face of danger. It would appear that this terrible toll of life will be levied so long as level crossings exist at congested points. The Railway Commission has adopted a plan somewhat analagous to that which has for some years prevailed in Massachusetts, under which the Federal government and the municipality affected in each case will contribute a percentage of the cost of subways and overhead structures. By this process the elimination of level crossings is hoped for in course of time.

There were 125,195 persons employed in the railway service of Canada on 30th June last. This number represented an increase of 18,791 over 1908 and of 1,183 over 1907. The total of salaries and wages was $63,216,662, representing 60.3 per cent. of operating expenses. The facts for 1907, 1908 and 1909 show that for all classes of employees there has been a persistent tendency upward in the scale of remuneration. The following comparison between the rates which prevailed in Canada in 1909 and those applicable to the United States in 1908 is instructive:

	Canada.	United States.
General officers	$11.73	$15.18
Other officers	4.59	6.42
General office clerks	1.81	2.35
Station agents	2.09	2.10
Other stationmen	1.65	1.82
Enginemen	4.13	4.46
Firemen	2.52	2.76
Conductors	3.31	3.83
Other trainmen	2.13	2.64
Machinists	2.89	2.95
Carpenters	2.23	2.40
Other shopmen	2.33	2.13
Section foremen	2.15	1.96
Other trackmen	1.59	1.45
Switch tenders, etc.	2.00	1.82
Telegraph operators, etc.	2.09	2.30
Employees, floating equipment	1.26	2.37
All other employees	1.95	1.98

Summing up, it may be assumed in reason that the railway situation in Canada discloses progress, strength and promise. The sympathetic relationship existing between the Dominion and the United States would seem to produce closely corresponding conditions on both sides of the line. This view is confirmed by the periodical reports of the American Car Association. When cars are accumulating in the United States the returns show a growing surplus in Canada. The great problems of transportation are being worked out on either side of the boundary under circumstances practically identical. We are now, however, confronting a situation in the prairie provinces very much like that which the rapid expansion of the western states created south of the 49th parallel twenty-five or thirty years ago. The demand for railways is greater than the power to build. Construction and equipment cannot be carried out in a day. Settlement exhibits the phenomenon of an ever-rising wave; existing lines are doing their best to answer the cry for transportation facilities; two new transcontinental railways are pushing their tracks with all possible haste to the Pacific coast; branches are being spread over the plains; and yet with all this activity the need of the West is growing greater year by year. James J. Hill has run eight lines up into Canadian territory from points along the Great Northern, showing his faith and interest in the development of our West. This he has done without a dollar of aid from government, and, according to the returns, at a considerable annual loss, as between income and outgo. He is regarded, however, as a shrewd appraiser of prospects, and is not asking for condolence in relation to immediate results. As on the southern side of the line, railway operators in Canada find themselves worried by a steadily swelling wages and tax bill on one hand and persistent pressure for lower rates on the other. Thus far they have escaped two-cent passenger rate, although two years ago, following the example of many of the states, a movement in that direction was begun in Parliament. It has apparently subsided.

General News Section.

According to a press despatch from Pittsburgh, the trainmen of the Pennsylvania Railroad have voted down the proposition to join the trainmen on other roads in a simultaneous demand at the present time for an increase in wages.

The Delaware, Lackawanna & Western is to open a school for apprentices at its Scranton shops, the work to be in charge of the Young Men's Christian Association. Spacious rooms have been set aside for the school at the shops.

The Pennsylvania Railroad has renewed for ten years, with the privilege of further renewal, its lease of the property at Cortlandt street, New York City, the terminus of its downtown passenger ferry from Jersey City; and it is planned to build a new ferry house.

The State Railroad Commission of Michigan is inspecting the cabooses of the railways of the state to see how well they comply with the law passed last year, requiring all cabooses to have end platforms and platform steps. There is a penalty of from $100 to $500 for violating this law, but some of the roads are not complying with it.

Under a law of Arkansas the railways of that state are now required to provide within the state hospital accommodation for persons injured on their lines. Officers of some of the roads say that in case of accident at some places near the state line it would be more convenient to take the injured persons to a hospital in another state.

Railway officers having said that 2,500 miles of new road would be built in Oklahoma in the near future but for the restrictions in the state constitution, citizens of towns in that state which are in need of new lines are trying to stir up public sentiment in favor of an amendment to the constitution cutting out the clauses which forbid the sale of an Oklahoma road to a corporation outside the state.

The railway commission of Canada, after a hearing, has decided not to recommend the running of freight trains without brakemen on the tops of the box cars. There was a demand that such a recommendation be made in order to make practicable the building of overhead bridges at a lower elevation, and thus in some cases reduce slightly the cost of putting in such bridges where needed for the abolition of grade crossings.

The Chicago, Milwaukee & St. Paul has secured trackage rights for freight over the line of the Sheboygan Light, Power & Railway Co., from Plymouth, Wis., to Sheboygan, about 14 miles. By this arrangement the Chicago, Milwaukee & St. Paul will be able to compete with the Chicago & North Western at Sheboygan, and will reach the private tracks of a number of factories there.

The Delaware, Lackawanna & Western reports that no passenger has been killed in a train accident on that road within the last ten years (to January 1, 1910). In this time the number of passengers carried has been 193,787,224. The average passenger journey was 19.91 miles, and the total passenger train mileage 65,340,908. Somebody has figured that this equals 19,927 trains from New York to San Francisco daily for 54 years.

According to the *Wall Street Journal*, the principle railways are making up statements so that they will be in position to pay federal corporation income tax, but all intend to protest that the law is unconstitutional. Moreover, they will also protest that the regulations and instructions sent out by the internal revenue office, designed to cure the ambiguities and other faults of the law, are illegal as being contrary to the plain terms of the statute.

Martin A. Knapp, chairman of the Interstate Commerce Commission, and Charles P. Neill, commissioner of labor, on January 6, wired S. E. Heberling, vice-president of the Switchmen's Union of North America, and F. O. Melcher, chairman of the General Managers' Committee of the Chicago railways, acceding to the request to mediate under the Erdman act the differences between the switchmen and the Chicago railways over wages. The first conference was to be held at Washington, January 12.

Press dispatches of January 4 indicate that the damage done to the roadbed of the San Pedro, Los Angeles & Salt Lake in Rainbow Canyon by the floods of January 1 is so extensive that through traffic over the road is likely to be suspended for two months or more. Many important bridges were destroyed, and the diminution of business is so great that large numbers of employees have been laid off. A train load of passengers was held east of Caliente, Nevada, five days.

The name of the "Overland Limited," which runs over the Chicago, Milwaukee & St. Paul and the Northwestern from Chicago to Omaha, and from Omaha to the Pacific Coast over the Harriman Lines, has had its name changed to the "San Francisco Limited." The "Overland Limited," under its present name, has become one of the most famous trains in the country. The change is to be made because another of the crack trains run over the same lines is called the "Los Angeles Limited," and the people of San Francisco could not stand such rank discrimination in favor of a competing city.

B. H. Meyer, chairman of the Wisconsin Railway Commission, has been selected by Chairman Knapp of the Interstate Commerce Commission and Labor Commissioner Neill as the third of the board who will arbitrate the controversy over wages between the Illinois Central and its telegraph operators. The other two arbitrators are Ira G. Rawn, president of the Chicago, Indianapolis & Louisville, representing the Illinois Central, and John A. Newman, representing the telegraphers. The arbitration will be conducted under the provisions of the Erdman act and the first session of the board will be held in Chicago on January 17.

Commenting on the problem of electrification of the Central Pacific over the Sierras, Mr. Kruttschnitt says: "Eastern critics may be inclined to the opinion that we are dallying with this matter. We have found that it pays well to make haste slowly with regard to innovations. Electrification for mountain traffic does not carry the same appeal that it did two years ago. Oil burning locomotives are solving the problem very satisfactorily. Each Mallet compound locomotive, having a horsepower in excess of 3,000, hauls as great a load as two of former types, burning 10 per cent. less fuel and consuming 50 per cent. less water."—*Wall Street Journal.*

The newspapers of Chicago have printed during the past week a good many rather sensational articles, to the effect that that city has been in peril of a coal famine. Inquiry among the coal-carrying roads elicits the information that they have had great difficulty in hauling the usual amount of fuel to Chicago, because of weather of almost unprecedented severity. But there has been some improvement in the weather, and by strenuous efforts the railways during the latter part of last week and the early part of this week substantially increased the city's fuel supply. In a good many cases it was necessary to give coal trains the right of way over ordinary commercial freight. The situation is now well in hand, and if there was at any time a danger of a coal famine it does not now exist.

The Board of Estimate and Apportionment of New York City has taken up the financial questions connected with proposed new subways in Manhattan and Brooklyn, and within the next two months expects to decide whether the city should furnish the money for such construction, or assessments should be made upon property benefited by the new lines, or a franchise should be granted for the construction of the lines by private capital. The new tax assessment just announced increases the powers of the city to borrow money, so that now there will be 76 millions available for subway construction as against 50 millions a year ago. The engineers of the State Public Service Commission have practically completed their plans for the principal new lines pro-

posed. It is expected that consents of property owners and other preliminaries will be completed so that the plans will be ready for bidders by March 1.

An officer of the Atchison, Topeka & Santa Fe gives the following explanation of the changes in through passenger service from Chicago to the Pacific coast that were made by this road on January 9: "Our passenger business has become so very heavy that we have found it necessary to increase our local service considerably in order to relieve through trains, and the California travel necessitates increased service to the Pacific coast. Our train No. 9, leaving Chicago at 9:30 a.m., at present consolidates with train No. 7 at Albuquerque and also has a Denver connection at La Junta. Under the proposed arrangement the train will leave Chicago as now, but at Kansas City will be divided, one train starting from there for Colorado and the other going through to California, which will really mean an additional train on our Coast Lines, Albuquerque west, and the Denver train from Kansas City to La Junta. It will practically mean no difference in our present time to the passengers traveling on this train from Chicago to Los Angeles, as the train will leave Chicago as at present, at 9:30 a.m., and arrive in Los Angeles on the third morning about 7:00 or 7:30 a.m., being scheduled to arrive there on train No. 7 at 7:05 a.m."

The Brooklyn Rapid Transit Co., which has recently announced a plan for paying pensions to superannuated employees, has notified conductors, motormen and guards on both surface and elevated lines of an increase of pay, to go into effect January 28, amounting, in most cases, to 1 cent an hour, together with an elaborate schedule of rates for men in their first, second, third, fourth, fifth and sixth years, by which in January, 1911, there will be a further advance of 5 mills an hour. Under the new schedules first-year men on the surface lines will receive 21 cents an hour. On the elevated lines first-year motormen will receive 26 cents; first-year conductors, 21 cents, and first-year guards, 18.5 cents. The motormen on the elevated lines receive an increase of 5 cents at the end of one year; the conductors an increase of 1 cent after two years, and another cent at the beginning of the third year. The guards on the elevated are advanced half a cent at the end of the second year; 1 cent the next year; then, after two years, 1 cent more. On the surface lines there is an advance of 1 cent at the end of the second year, 1 cent a year later, and then 1 cent two years after that; but the men on the surface lines showing good records can attain the maximum rate one year earlier than the schedule provides. The first-year man, to thus gain time, must have not over 20 demerits; at the end of the second year he must have a record free of demerits; or, if the record is not satisfactory, his promotion will be simply postponed until he clears it. Satisfactory service for a certain length of time has the effect of reducing and finally wiping out a demerit record.

Corrected Record of Rolling Stock Ordered in 1909.

Delayed returns from railway companies show the following orders for rolling stock that were placed during 1909 and were not included in our table of cars and locomotives ordered, published December 31, page 1291:

Purchaser.	Locomotives, No.	Cylinder.	Weight, lbs.	Type.	Builder.
Del., Lack. & West'n....	6	21 x 26	190,000	2-8-0	American.
N. Y., Phila. & Nor.....	4	24 x 28	238,000	2-8-0	Company shops.
N. Y., Phila. & Nor.....	2	20 x 24	144,100	0-6-0	Company shops.

Purchaser.	Freight cars. No.	Kind.	Capacity.	Builder.
N. Y., Phila. & Nor..†115		Box.	100,000	Company shops.
Gulf, Texas & Western.	1	Caboose.	.....	Barney & Smith.
Midland Valley *100		Tank.	80,000	Amer. Car & Fdy.
San Rafael & Atlixo....†20		Box.	40,000	Pressed Steel.

The corrected totals are as follows:

Locomotives:	
Total	3,362
Compound	238
Mallet	163
Freight cars:	
Total	189,596
All-steel	74,920
Steel underframe	77,667
Passenger cars:	
Total	4,514
All-steel	1,635
Steel underframe	943

Telephones on the Big Four.

The Cleveland, Cincinnati, Chicago & St. Louis has lately put in service its telephone despatching line between Cincinnati and Columbus, 125 miles. On this line there are 49 telephones, and it is called a "heavy" district. Telephones have been used between Indianapolis and Cincinnati about eight months, and within a month they will be in service from Cleveland to Columbus, and from Galion to Bellefonte. These three districts will make about 425 miles. Each way-station has a single telephone, arranged to be quickly switched from the despatcher's circuit to the circuit used in manual block signaling. This road has put telephones and "fish poles" on all of its wrecking cars. Between Indianapolis and Cincinnati the telephone line is parallel to an electric railway line for about 47 miles, where there are feed wires carrying currents of 33,000 volts; but, by proper transposition, the telephone lines are worked with no trouble whatever from induction, although the high power line is at one point within 12 ft. of the telephone line. The Big Four uses Sandwich selectors.

A German Automatic Stop and Cab Signal.

The *Scientific American* of January 8 describes an automatic train stop which is being tried on one of the lines of the German government railway administration. In consequence of the disastrous crossing collision which occurred on the Berlin Elevated Railway a year or two since, the government has been giving increased attention to automatic stopping devices, and it is said that this one has been "provisionally adopted." Its chief peculiarity is a double tripping device. The trips on the ground are placed in pairs, side by side, one about six or eight inches outside the right-hand rail, and the other the same distance inside the same rail. The lever on the engine, which actuates an air-brake valve fixed on the running board in front of the main driving wheel, and about 5 ft. above the rail, is extended, by a vertical rod, downward to a point about a foot above the rail, where it is held in place by a bracket fixed to the locomotive frame and is forked in such a way as to make two contact bars, one to engage with each of the two trips on the ground. To actuate the air-brake valve both of these contact bars must be moved, and moved simultaneously; and thus if one of them alone is moved, as, for example, by a stone or other accidental obstruction, the valve is not affected. Just how the bars are arranged to accomplish this is not clearly described, although three pictures are given of a passenger engine equipped with the apparatus. The movement of the contact bars, when the trips are in operative position, not only opens the air-brake valve, but also, by closing an electric circuit, gives an audible and a visual signal in the cab, the audible signal being a whistle. In the cab there is also a recording attachment consisting of clockwork, and a paper tape moved by a roller, on which, by dashes and dots, the movements of the stop apparatus are recorded. The power required at the air-brake valve is furnished by a spiral spring, and the function of the trip is to disengage the detent which holds this spring compressed. A pair of the track trips is placed at the distant signal. The engineman may throw the apparatus out of gear and retain control of his train; or it may be locked so that he cannot resume control until a trainman restores it for him. At a home signal there are two pairs of trips, one fixed about 100 ft. in advance of the other. On passing a home signal which is against him, an engineman finds that the apparatus acts the same as at a distant signal, but only during a very short time; and then, on passing the second pair, this effect is reinforced, the trips acting so as to open the brake valve farther.

On approaching a signaling point, the engineman, by making a suitable mark on the sheet of the automatic record, may record the fact that he has duly observed the outdoor visual fixed signal.

A pair of track trips weighs only about 8 lbs., and they are so designed that they can be fixed to the track temporarily at any joint, thus being available where it is desired to have the rear brakeman protect the train. The account says that if the brake lever connection is disabled

by being broken, the fact is automatically indicated on the visual signal in the cab. Moreover, a "specially ingenious construction" enables the apparatus, even then, to work as usual on passing over the next signal!

Progress on New York State Barge Canal.

State Engineer F. M. Williams reports that there have been excavated on the new and enlarged Erie canal more than 25,000,000 cubic yards of material, and over 2,500,000 cubic yards of embankment have been built. There have been laid more than 500,000 yards of concrete. The total value of the work completed since the beginning is $15,800,000, and it is estimated that during the year 1910 work will be completed amounting to $16,000,000. The building of this canal has called into use every type of machinery employed in works of construction, and it is estimated that there is at present invested in operating plant about $7,600,000.

By April 1 next it is expected that the work for the entire length of the canal will be under contract, and it is not unreasonable to expect that at the present rate of progress the entire canal will be completed by the end of 1914. The work is being carried on within the original estimates, and present calculations give assurances that all the construction contemplated by the law of 1903 will be completed within the original appropriation of $101,000,000.

The act provides for the construction of a canal having a minimum bottom width of 75 ft. and a minimum depth of 12 ft. in land line. The locks are designed for boats of 2,000 tons capacity; there will be 53, ranging in lift from 10 ft. to 40½ ft., this latter lift occuring at Little Falls. Fifteen of the large locks are now completed, with the exception of gates and operating machinery, and three of these locks will be used as a part of the state canal system on the opening of navigation next spring. When completed, the barge canal locks, with their immediate approach walls will have cost approximately $16,000,000. There will be 22 fixed dams and 14 movable dams. Of the latter seven are now under construction, two of them nearly completed. By one year from next spring the eight movable dams in the Mohawk river will be in operation and will be used to aid in the dredging of the channel, by retaining water for the floating of the dredging machinery.

Of the fixed dams the largest structure is at Crescent on the Mohawk river, being an arched dam with a spillway 1,487 ft. in length, with length over all of about one-third of a mile. This dam will be completed next summer.

The First Locomotive.

The following extract is reprinted from the American edition of the English book, "A Practical Treatise on Railroads," by Nicholas Wood. The first English edition was printed in 1825; the second in 1831. In 1832 Messrs. Carey & Lee, of Philadelphia, published an American edition, with a preface and some additions edited by George W. Smith. This extract records an early date, 1804, for successful operation of a steam locomotive. It might fairly be called either the first automobile or the first locomotive, because it ran on the street where it was smooth enough, and on a prepared track where there were ruts.

"More than 35 years ago, in 1797, Oliver Evans of Philadelphia discovered the hitherto unsuspected value of railways and published to the world that their merits had been unappreciated, their properties misunderstood, and their capacity for extended usefulness undeveloped. He earnestly maintained that they ought not to be confined to limited districts, as the mere auxiliaries or inferior substitutes to canals; that they were, in fact, greatly superior to the latter for the purposes of general commerce and on the most extended lines. In these just, and now popular opinions, he stood alone—holding them not the less undubitable because they originated with him. No human being, either in Europe or elsewhere, had even dreamed that railways were adapted to the transportation of passengers or merchandise, or that they could be usefully extended beyond a length of a few miles. * * *

"Oliver Evans, who had never heard of steam being applied to this purpose, was early impressed with its importance, and commenced his celebrated experiments in 1784, and finished his first engine in 1801. Poverty compelled him to sell it to be used for another purpose. The other machinery of the carriage was in existence a few years ago. He immediately commenced another engine and carriage, and in the latter part of the winter of 1803-4 he propelled it by steam through the streets of Philadelphia, in the presence of more than 20,000 astonished and hitherto incredulous spectators. No railway then existed in America to test the capacity of this rude but primitive locomotive steam engine; a temporary railway (the first ever attempted in America) was employed to prevent the wheels sinking into the ruts, or inequalities, on part only of the road traversed. This was the humble origin of that wonderful machine which is destined to revolutionize commercial intercourse by land. The plans and numerous drawings of Mr. Evans were sent to Europe by his agent and exhibited to many persons; his suggestions were copied without acknowledgement, and others have reaped the benefit of his discoveries.

"The superiority of railways to canals, even when horses were employed on both, was zealously maintained by Evans before it had been imagined in Europe or this country, and their greater superiority, when locomotive engines should be adopted was repeatedly pressed on the public attention. He endeavored without success to urge the execution of a road from Philadelphia to Pittsburgh and several years afterward of a railway from this city to New York. In the latter he offered to take stock to the amount of $25,000; but he was in advance of the age in which he lived. His projects were regarded as visionary; although at the present moment both of these important roads are in rapid progress and in a few months passengers will be whirled over these railways and gratefully remember their benefactor, Oliver Evans, a man whose projects have been in this instance accomplished, and whose predictions have been fulfilled to the very letter, although a straight jacket was voted to him formerly, almost by acclamation, as the reward of his genius. Fitch, who constructed the first steamboat at Philadelphia in the year 1787 and Fulton of Pennsylvania, who successfully introduced steam navigation, also obtained poverty and ingratitude as the reward of their exertions."

Progress of the B. & O. Since 1896.

President Murray, in statement given out in answer to newspaper criticism of the management of the Baltimore & Ohio, says in part:

"When in 1896 the receivers took charge the property then operated consisted of 2,094 miles of line, of which but 623 miles was double track. Its buildings, structures and terminals were wholly inadequate and the tracks, bridges and roadbed were in urgent need of immediate repairs and renewals. The freight equipment consisted of 26,440 cars, 5,000 of which were idle awaiting repairs, and of the 857 locomotives over 200 were unfit for service.

"The first work of the receivers was to renew and practically rebuild the then property, in which the entire line was relaid with heavy rails, replacement of bridges, etc., but the great work of extension and betterment was in the expenditures for new construction made on the entire system, comprising the original line and lines subsequently acquired and operated. In this there has been expended from 1896 to December 31, 1909, $91,356,582, and to complete construction and betterments now authorized and being actively progressed will require over $10,000,000 additional or a total of over $101,000,000. In addition the expenditures for new and modern equipment of the highest capacity, 1896 to December 31, 1909, have amounted to $60,347,421, and with equipment contracted for and now being delivered, costing approximately $14,000,000, will aggregate over $74,000,000. At present the equipment consists of 1,906 locomotives and 81,978 freight cars, to be shortly augmented by 100 locomotives and 10,000 freight cars, now under contract. The expenditure of $151,704,000 in a period of thirteen years, with the further engagement of $24,000,000, exclusive of expenditures for subsidiary terminals such as the company's interest in the Washington

Terminal, the Chicago Terminal Transfer, etc., aggregating many millions more, are figures which render ridiculous the suggestion that 'the B. & O. has not expanded,' or that its policy has been 'a negative one.'

"The effect of these physical expansions, the improvement and betterment of the roadway and equipment are reflected in the increased traffic of the system.

"The miles of line operated in 1896 were 2,095, and total trackage 3,541 miles.

Gross revenue	$23,944,781
Total revenue tonnage, tons	17,861,927
Bituminous coal tonnage, tons	6,445,417

"For the year ended June 30, 1901, the miles of line operated directly were 3,220, and the total trackage 5,521 miles.

Gross revenue	$47,971,223
Total revenue tonnage, tons	33,528,513
Total bituminous coal tonnage, tons	13,346,700

"In contrast with the foregoing are the figures for the year ended June 30, 1909:

"The miles of line operated directly were 4,000, and total trackage 7,509 miles.

Gross revenue of "income lines"	$71,043,519
Total revenue tonnage, tons	48,223,474
Bituminous coal tonnage, tons	20,956,585

"If the controlled or affiliated lines be included it adds 456 miles of line, trackage aggregating 831 miles, and brings gross revenue up to $76,412,856.

"As is evident, the figures above for 1909 include tonnage of certain lines not controlled or operated in 1896 or 1900, but the contrast affords some conception of the vast territory added and the increased traffic coming under the direct influence of the Baltimore & Ohio; while through the arrangement recently accomplished in connection with the C., H. & D. the sphere of reciprocal relationships is made even more extensive."

Railway Regulation in New Jersey.

In his annual message to the New Jersey Legislature, Governor J. Franklin Fort, discussing means to regulate public utility corporations, says:

"The opposition to such legislation emanates solely from interested sources and corporations which control the franchises for public utility purposes. If the people of the state could fully realize the character of the influence exerted to defeat this beneficent legislation the result would not be doubtful. * * * The law should be clear and stringent against any attempt at the merger of public utility companies, or the issuance of bonds or stock by such companies, except upon the approval of some state board."

The Governor recommends an additional appropriation to continue the work of the commission to revalue the railway property of the state. On this point he says: "For many years there has been much criticism of the valuation of railway property. Whether just or unjust, the matter should be put at rest. The valuation will cost probably one hundred thousand dollars in addition to the sums already spent; but the taxation of railway property should not longer be allowed to be a matter for political discussion, and the fairness and justness of its valuation should be settled at once and for all time. The cost of the revaluation of the railways in other states has not been less in any case than $150,000, and the work of the revaluation of the railway property of the New York Central, which was done some years ago by the road itself, cost in excess of $200,000."

Scherl Monorail Gyroscope Car.

A gyroscope monorail car of the German type, invented by Richard Scherl, is being exhibited in Brooklyn, N. Y. This is the first time that monorail cars have been shown in this country, although both this car and one of the Brennan type had been undergoing tests for some time in England and Germany.

This Scherl car is 18 ft. long and 4 ft. wide, with seats for four passengers, and has two gyroscopes, one in each end of the car. These revolve in vacuum in opposite directions, said to be at a speed of 8,000 r.p.m. The gyroscopes are operated by motors, the current of which is taken from two feed wires at the base of the rail, one on either side. The weight of the car is about 2½ tons, about 5½ per cent. of which is due to the gyroscopes. It is claimed that with a modern passenger car it would be necessary to increase the weight of the gyroscopes, making them about 8 or 9 per cent. of the entire weight.

In case of accident to the motors, it is claimed that the gyroscopes will continue to revolve without current for about an hour and maintain its equilibrium. The car has two trucks, each having two double-flanged wheels. In the demonstration the car kept perfect balance, both while running and standing, at which latter time, however, a slight swaying motion was noticeable.

General Passenger and Ticket Agents.

The annual meeting of the American Association of General Passenger and Ticket Agents will be held at Havana, Cuba, March 28.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; May 10-13; Indianapolis.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa. June, 1910; Niagara Falls, Ont.
AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASSN'S.—G. W. Dennison, Penna. Co., Toledo, Ohio.
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., New York; second Friday in month; New York.
AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; May 18; New York.
AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—S. F. Patterson, B. & M., Concord, N. H.
AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago, March 14-17, 1910; Chicago.
AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis; second Tuesday, May; Memphis, Tenn.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago; June 20-22; Atlantic City.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., N. Y.; 2d Tues. in month; New York.
AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—B. V. Swenson, 29 W. 39th St., New York.
ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; June 29, 1910; Colorado Springs.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A., T. & S. F., Topeka, Kan.; May; Nashville, Tenn.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wisconsin Central Ry., Chicago; May 16-20, 1910; Los Angeles.
ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Place, N. Y.
BUFFALO TRANSPORTATION CLUB.—J. M. Sells, Buffalo.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R. R., Richmond, Va.; June 15, 1910; California.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May; Chicago.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.; May; Cincinnati.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 15-17; Atlantic City.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York.; 3d Friday in month, except June, July and August; New York.
NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.
RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio; May 16-18; St. Louis.
ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Norquist, Chicago.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La.
SOUTHERN AND SOUTHWESTERN RY. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.
TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R. R., East Buffalo, N. Y.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, 199 Chestnut St., Winnipeg; 2d Monday, except June, July and August; Winnipeg.
WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.
WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; 1st Wednesday, except July and August; Chicago.

Traffic News.

The first through train of transcontinental freight over the Western Pacific, 50 cars, mostly loaded with wire and nails from Joliet, Ill., passed through Sacramento, December 28.

The Rogers-Brown Iron Company, of Buffalo, announces that it is going to build new furnaces and coke ovens along the line of the Buffalo & Susquehanna, sufficient to double the quantity of coke to be shipped over that road.

The Omaha Grain Exchange has filed with the Nebraska Railway Commission a complaint alleging that the rates of the Union Pacific and the Burlington on grain to Omaha are unfairly discriminatory as compared with the rates to Kansas City.

The Union Pacific has announced that it will make the same rates on lumber shipments from Washington to points east of Denver as it now makes on lumber from Oregon. This is one of the first traffic moves made by the Harriman lines since gaining access to Puget Sound.

The Baltimore & Ohio will run an agricultural educational train January 18, 19 and 20 from Wheeling, W. Va., to Zanesville, Ohio, and other places in that region. Professor H. C. Price, dean of the agricultural department of Ohio State University, will manage the lectures which are to be given.

The Western Pacific has made traffic agreements with the Southern Pacific and the Atchison, Topeka & Santa Fe by which westbound transcontin ntal freight over the W. P. will be billed to points on the other lines as far south as Santa Margarita and Bakersfield, as well as to all northern California.

The western roads have been trying vainly to reach an understanding about the making of reduced passenger rates during 1910. At one time it was announced that a decision had been made, but some of the roads kicked over the traces, and now the matter is in an entirely unsettled condition. A two-days' conference was held by the passenger officers in Chicago last week, which resulted in the entire matter being referred to the executive officers.

The Individual Car Owners' Association, of which Robert J. Bailey of Pittsburgh is secretary, has sent its complaints about abuses to the Pennsylvania State Railroad Commission. The complaints of this association concerning the way the cars of its members are treated by the railways have been set forth in the columns of the *Railway Age Gazette*. The letter to the commission says that relief has been asked from railway associations, but in vain.

The State Railroad Commission of Louisiana has before it a petition, presented by the New Orleans Board of Trade, asking that express companies be required to put more effective labels on packages which have been prepaid. The petition sets forth at great length the complaint of large shippers that the habit of collecting charges on packages which have been prepaid is general and persistent. The petitioners cannot understand why the express companies should annoy their customers in this way so much more than do the freight departments of the railways.

The Illinois Central, the Southern and the Cincinnati, New Orleans & Texas Pacific have decided not to renew their traffic agreements with the Tennessee Central, which will expire within a few months. The Illinois Central and the Southern operated the Tennessee Central for about three years, ending in 1908; but they concluded not to make that arrangement permanent, and suits are pending in the courts relative to differences of several hundred thousand dollars in connection with the settlement between the companies which should have been made when the Tennessee Central was turned over to its owners.

The immigrant bureau of the Western Passenger Association has issued the following figures showing the arrivals at the port of New York for the first 11 months of 1908 and of 1909: In 1908, aliens, 245,785; citizens, 26,131; total, 271,916. In 1909, aliens, 687,820; citizens 32,811; total, 720,631. The total revenue derived from the immigrant business by immigration bureau lines in the last five years is given as follows: In 1905, $919,852; in 1906, $1,175,171, an increase of 27.76 per cent.; in 1907, $1,549,687, an increase of 31.87 per cent.; in 1908, $607,248, a decrease of 60.81 per cent.; in 1909, $1,156,575, an increase of 90.46 per cent.

The newspapers announce that a number of changes in rates have been made by the Spokane, Portland & Seattle and the Oregon Railroad & Navigation Company from points between Spokane and Portland. New rates have been made by both roads on packing house products and fresh meats C.L. and L.C.L. from Portland to the Spokane district. The rate on packinghouse products between these cities has been reduced from $1.11 to 90 cents, and the rate on dressed poultry C.L. from $1.63 to $1.25. The rate on pig iron is reduced from $6.50 to $3.50 a ton and the rates on live stock from stations between Portland and Spokane have been reduced 25 per cent. to both cities. Some slight advances are made in the rates on certain other commodities.

The western lines have filed a notice with the Interstate Commerce Commission revoking their concurrence in the rates filed by the eastern roads, effective January 1, on sugar and coffee from New York, Jersey City and Philadelphia to points west of the Mississippi river. This action of the western roads grows out of a small rate war which has been going on between the roads, reaching Chicago from the East and those reaching Chicago from New Orleans. The rates filed by the eastern trunk lines reduce by approximately 7 cents per 100 lbs. the rates from the East to points beyond the Mississippi river. This reduction was made to meet reductions that have been made by the Illinois Central and other lines from the South. The effect of the reduction by the eastern lines is to shrink the proportions received by the western roads more than they feel that they should stand. If this revocation by the western roads stands rates on sugar and coffee from the East to points west of the Mississippi river will have to go on a combination of the rates of the eastern road to Chicago with those of the western roads from Chicago.

Hudson and Manhattan Increased Traffic.

With the 52 per cent. increase of passenger traffic in the month of December over August, putting the yearly rate at 48,643,032, the Hudson & Manhattan, operating the tunnels under the Hudson river between New York and New Jersey, is earning at the present time 4.9 per cent. on its $10,000,000 5 per cent. non-accumulative preferred stock. This is shown as follows:

Gross revenue of 48,643,032 passengers at a 5-cent fare...	$2,432,151
From previous estimates, operating cost, including taxes, will not exceed 40 per cent, or.....	872,860
Net passenger earnings	$1,559,291
Earning capacity of the terminal buildings.....	1,200,000
Advertising and miscellaneous privileges.....	300,000
Total, including passenger earnings	$3,059,291

After deducting $2,567,000 for interest on bonds issued, a surplus of $492,291 is left, equal to 4.9 per cent. on the preferred.

Passenger traffic for the month of December, 1909, showed an increase of 190 per cent. over the corresponding month of the previous year. The average monthly increase since August last has been 10 per cent. From the following table an idea may be obtained of the steady traffic increase since the first part of the system was opened:

	Days.	Passengers per period.	Daily average.
1908—Feb. 26 to June 30.....	126	4,480,320	35,304
July 1 to Sept. 30.....	92	2,427,461	26,385
Oct. 1 to Dec. 31.....	92	3,794,585	41,245
1909—Jan. 1 to March 31.....	90	4,049,319	44,992
June 1 to July 15.....	45	2,104,740	46,992
July 16 to Aug. 1.....	16	1,360,000	85,000
Aug. 2 to Aug. 30.....	29	2,755,000	95,000
Aug. 31 to Sept. 24	25	2,875,000	115,000
Sept. 25 to Oct. 2.....	8	1,128,000	141,000
Oct. 3 to Oct. 10.....	8	920,000	115,000
Oct. 11 to Oct. 31	20	2,360,000	118,000
Nov. 1 to Nov. 30.....	29	3,452,500	122,000
Dec. 1 to Dec. 31.....	30	4,053,586	130,760
Total	610	35,760,511	.....

The eight-day period showing a daily average of 141,000 was during the Hudson-Fulton celebration and cannot be used as a criterion. After the celebration the traffic became normal

and has been steadily increasing since that time. Daily average at the present time is approximately 131,000.

These figures are still based on what the company's officials term a "shuttle service." This is because neither terminus of the system is completed, and it will be several months before the New York line will run to the Thirty-third street extension. It is estimated that the opening of this line will give the company an increase of 30 per cent. in traffic, as the line reaches the heart of the shopping district and is in close alliance with the new Pennsylvania terminal at Thirty-third street.

Work is rapidly progressing on the Jersey side and when completed it is thought that the Henderson street terminus will give a passenger increase of at least 20 per cent.

Most of the property owners consents for the Grand Central extension have been obtained, and that the line should be in operation prior to 1912.—*Wall Street Journal.*

A Contrast.

A prominent manufacturer in Salt Lake City has a freight bill for a carload of cotton piece goods shipped by water from New York to Galveston and by the Santa Fe and Denver & Rio Grande railways to Salt Lake, 60,336 lbs., at $2.25 per 100 lbs., the total of which is $1,357.56. If this same shipment had been consigned to San Francisco, Portland, Seattle, or Los Angeles, the rate would have been $1.10 per 100 lbs., or $663.69, and this, too, for all-rail service. The Salt Lake manufacturer, for the same shipment by rail all the way would have been called on to pay freight charges of $1,773.93. —*Exchange.*

INTERSTATE COMMERCE COMMISSION.

Carrier having for its own convenience furnished shipper two smaller cars instead of one of capacity ordered, it was unreasonable to charge on basis of combined minima of two cars furnished. (17 I. C. C., 322.)

Back Haul Rates at El Paso.

F. H. Bascom Co. v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Harlan.

The defendant, while maintaining an open fifth class rate of 30 cents per 100 lbs. from El Paso back to local points on its line, also publishes and maintains a special rate of 10 cents per 100 lbs. applicable only to merchandise that has come into El Paso, at any time in the past, over its own lines. The rate is unlawful and discriminatory and is not justified or excused by the fact that El Paso is a highly competitive point. Defendant's contention that the 10-cent rate is a proportional rate is not sustained. The rate is a mere concession in the outbound rate and a device to force traffic to El Paso over its own lines by denying its use to merchandise that has come to that point over competing lines.

Ten-Car Rate Referred To.

Carstens Packing Co. v. Oregon Short Line et al. Opinion by Commissioner Harlan.

It is held that defendants' carload rates exacted on shipments of complainant's cattle from Glenn's Ferry, Idaho, and Mountain Home, to Tacoma, Wash., were unreasonable and ought not to have exceeded the rates that were subsequently voluntarily established by the defendants from those two points. Reparation awarded.

The record presents in an emphasized form the question of the validity of a 10-car rate. Because of the long-continued practice of carriers to which the commerce of the country had adjusted itself the commission early in its history accepted as valid and justified a carload rate that was less proportionally than the rate on a less-than-carload shipment of the same commodity. But whether that principle may wisely be extended further so as to justify what may be called wholesale rates—that is to say, rates established by carriers on the theory that a shipper who is able to deliver traffic in 10 or more cars is entitled to lower rates proportionally than a shipper who is able to deliver traffic by the carload only, is a very doubtful question. It has not been argued in this proceeding, although the question is somewhat involved in the issues presented, nor is any ruling on the question necessary to sustain the disposition made of the complaint. It is referred to only because we desire it to be understood that nothing herein said shall be taken either as an approval of or acquiescence in a 10-carload rate, or, to use a convenient phrase, in wholesale rates of any kind beyond the carload rate. (17 I. C. C., 324.)

Damages Due to Delay Left to Court Determination.

H. W. Joynes v. Pennsylvania Railroad. Opinion by Commissioner Harlan.

Petitioner, a dealer in fruits and general produce, charges discrimination, in that the defendant persistently delayed his shipments of fruit in Pittsburgh at the Fifty-fourth street yards where the cars were not accessible to teams and could not be unloaded by him, while at the same time cars of other shippers were promptly placed in position at the unloading platform and were thus given a preferred use of the defendant's terminal facilities, and because of the delay and discrimination petitioner suffered loss through the decay of the fruit and otherwise in the sum of $30,498, for which amount he claims reparation. It is held that the commission is without power under the law to make awards of general damages of that nature.

In cases of the nature involved in the complaint the commission may ascertain whether the discrimination alleged actually occurred or whether the carrier has failed in a duty imposed on it under any provision of the act as charged in the complaint. But the assessment of any resulting damages, other than damages that may be measured by differences in rates, must be left to be determined by action brought in a court of competent jurisdiction.

The language of the act being of doubtful interpretation, the commission, which is a special tribunal of limited powers, ought not to take jurisdiction, but should resolve the doubt in favor of the courts where claims of this nature ordinarily belong. Section 15 is the dominating and controlling expression of the real object and meaning of the act in its present form. It makes of the commission what it was undoubtedly intended to be, namely, a special expert body created for the purpose of dealing with the rates and practices of carriers affecting rates, and not a body to take the place of the courts for the redress of alleged wrongs of the character involved in the complaint. (18 I. C. C., 361.)

STATE COMMISSIONS.

The Michigan State Railroad Commission in drafting rules for demurrage has ignored the views of the Interstate Commerce Commission and has issued an opinion holding that demurrage matters are purely local.

The Illinois Railway Commission has exempted the Indiana Harbor Belt from its rules fixing the rates for switching within the Chicago district. The Indiana Harbor Belt presented statements showing that the rates as applied to it were confiscatory.

The Georgia Railroad Commission has issued an order that no rates now in effect, or which may hereafter be made so, and which are not higher than such as are established by the commission, shall be discontinued or increased except by its order or consent. All railways and public service corporations in the state are required to file with the commission on or before Feb. 1, full schedules of all their charges and copies of all their rules and regulations in dealing with the public.

The New York Public Service Commission, First district, has ordered all railway and street railway corporations that come under its jurisdiction to file with the commission books, records, contracts, documents and other papers, a long list of which is given in the order. Both steam and electric railways operating part of their mileage outside of the jurisdiction of the commission are required to file only documents relating to the business and franchises of that part of their lines under the jurisdiction of the commission. This order supersedes that of August 2, 1907.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF NOVEMBER, 1909.
(See also issue of January 7, 1910.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses					Net operating revenues (or deficit).	Outside operations. net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	General.	Total.				
Atlanta, Birmingham & Atlantic	641	$177,256	$48,549	$239,702	$25,303	$34,548	$11,889	$81,024	$8,999	$161,763	$77,939	.....	$17,433	$60,506	$35,576
Baltimore & Ohio	4,198*	5,861,940	1,079,855	7,351,673	830,129	1,421,960	138,310	2,388,122	129,064	4,907,585	2,444,090	—$59,096	190,399	3,194,595	475,046
Bangor & Aroostook	530	175,893	57,917	244,682	37,589	26,008	2,312	68,895	9,951	144,755	99,927	.....	1,500	98,427	27,355
Bessemer & Lake Erie	201	736,490	23,207	768,517	60,504	104,834	5,785	175,876	7,014	354,013	414,504	.....	5,000	409,504	217,334
Buffalo, Rochester & Pittsburgh	567	661,409	73,712	770,663	69,139	165,297	8,965	209,944	12,492	465,837	304,826	212	13,000	292,038	156,125
Central R.R. of New Jersey	668	1,732,438	342,737	2,193,110	178,730	314,884	29,643	546,835	37,810	1,107,902	1,085,208	—5,733	92,117	987,358	304,660
Chicago Great Western R.R.	1,486†	794,082	200,787	1,064,992	102,119	105,338	39,885	416,774	32,971	697,087	367,905	—4,209	27,319	336,377	.....
Chicago, Indianapolis & Louisville	616	353,426	113,855	509,224	62,110	68,090	13,619	152,681	14,544	311,044	198,180	.....	20,500	177,680	64,618
Chicago, Rock Island & Gulf	529‡	250,052	64,275	325,157	40,668	22,642	6,371	98,709	8,508	176,898	148,259	—250	4,550	143,459	73,228
Cincinnati, Hamilton & Dayton	1,036	662,320	131,852	898,533	112,339	134,627	21,099	326,735	20,184	614,984	283,549	.....	25,833	257,716	121,971
Cleve., Cin., Chicago & St. Louis	1,982	1,793,908	567,056	2,584,504	306,579	421,028	75,909	900,794	48,720	1,753,030	831,474	—10,879	71,000	610,396	353,035
Denver & Rio Grande	2,553	1,597,506	437,027	2,117,055	241,423	348,176	39,453	752,731	47,908	1,429,691	687,364	—5,968	13,500	301,796	128,316
Elgin, Joliet & Eastern	770	704,767	5	771,979	67,794	147,370	3,857	224,627	13,035	456,683	315,296	.....	11,544	37,967	112,804
Florida East Coast	583	119,688	63,469	207,785	29,681	35,758	6,348	75,944	10,543	158,274	49,511	.....	9,300	208,383	17,921
Fort Worth & Denver City	454	338,584	134,840	493,502	49,052	56,791	6,364	150,744	14,750	277,701	215,801	1,882	20,737	122,090	38,418
Grand Rapids & Indiana	587	271,794	123,895	425,658	33,181	65,449	10,541	161,116	12,584	282,871	142,787	40	21,909	261,137	30,023
Hocking Valley	350	597,966	71,706	690,909	91,245	126,371	6,815	185,760	10,869	421,060	269,849	13,197	9,404	205,018	89,475
Houston & Texas Central	789	418,778	127,868	582,154	76,190	56,475	16,167	198,237	20,662	367,731	214,423	.....	18,627	125,696	—28,764
Lake Erie & Western	886	385,653	60,550	471,547	68,192	80,874	12,068	156,757	9,333	327,224	144,323	.....	125,000	1,501,884	66,207
Lake Shore & Michigan Southern	1,663§	2,853,811	770,375	4,092,945	487,451	594,003	89,479	1,230,356	56,354	2,457,643	1,635,302	—8,418	125,445	1,691,749	264,438
Louisville & Nashville	4,542‡‡	3,393,270	857,273	4,540,696	511,798	673,666	90,543	1,345,709	80,515	2,702,231	1,838,465	—21,271	39,141	229,217	514,557
Maine Central	932	489,568	221,213	755,177	117,357	104,332	6,629	241,605	20,330	490,253	264,924	3,434	94,000	820,852	65,561
Michigan Central	1,746	1,780,783	518,316	2,526,762	304,209	308,994	55,606	898,258	37,622	1,604,689	922,073	—7,221	21,956	270,416	279,864
Mobile & Ohio	1,114	685,253	110,335	924,343	114,676	168,358	31,258	282,121	32,663	629,076	295,267	—2,895	434,592	2,413,110	16,685
New York Central & Hudson River	3,587	5,395,226	2,200,319	8,441,637	1,044,226	1,391,353	209,426	2,859,740	133,677	5,638,422	2,803.215	44,487	33,000	322,979	628,412
New York, Chicago & St. Louis	559	758,197	116,590	908,126	23,641	125,052	45,371	340,853	15,604	550,521	557,605	—1,626	5,900	80,911	106,171
Norfolk & Southern	592	162,234	52,296	228,605	22,976	31,045	3,493	68,939	15,333	141,786	86,819	—8	254,237	2,661,723	17,898
Northern Pacific	5,691‖	4,714,945	1,589,092	6,690,435	728,115	785,171	80,514	2,124,194	88,087	3,801,081	2,889,354	26,606	92,190	475,189	—372,520
Oregon R.R. & Nav. Co.	1,327¶	907,361	329,427	1,311,040	153,205	91,273	30,782	429,710	34,351	739,321	571,719	—4,340	73,386	1,528,873	—120,467
Philadelphia & Reading	1,024°	3,242,198	538,467	3,953,650	237,865	881,442	31,716	1,138,941	59,571	2,349,535	1,604,115	—1,856	10,808	75,555	301,773
Rutland	468	178,203	80,016	287,915	39,599	40,052	6,945	109,440	5,516	201,552	86,363	.....	16,000	988,234	8,712
Pittsburgh & Lake Erie	191	1,470,571	114,510	1,622,722	155,776	122,061	11,611	309,728	18,926	618,103	1,004,619	—385	14,892	161,968	534,729
Toledo & Ohio Central	441	324,686	48,228	389,160	48,199	54,627	5,334	111,459	7,187	226,806	162,354	14,505	4,750	56,219	62,436
Trinity & Brazos Valley	455δ	243,189	16,768	263,628	42,096	39,513	5,323	103,563	12,164	202,659	60.969	.....	64.495	767,798	—52,245
Wabash	2,515	1,782.950	549,735	2,529,408	350,485	330,991	69.169	877,634	64,755	1,693,034	836,374	—4,081	23,217	183,857	332,071
Wheeling & Lake Erie	458△	535,771	43,164	621,756	45,200	144,340	7,900	212,828	13,111	423,379	198,377	8,697			155,110
					FIVE MONTHS OF FISCAL YEAR.										
Atlanta, Birmingham & Atlantic	641	$786,754	$229,380	$1,071,871	$130,511	$163,198	$58,176	$408,243	$43,704	$803,832	$268,039	.....	$49,433	$218,606	$29,946
Baltimore & Ohio	4,198*	28,986,557	6,335,220	37,233,833	4,831,183	6,524,967	744,875	11,489,269	641,906	24,232,201	13,001,632	—272,382	910,914	11,818,336	1,532,606
Bangor & Aroostook	530	816,727	315,393	1,195,234	185,231	142,975	13,713	328,079	50,090	720,088	475,146	.....	7,500	467,646	66,074
Bessemer & Lake Erie	201	4,097,053	170,023	4,306,126	326,709	557,558	34,295	919,310	33,719	1,871,591	2,434,535	.....	25,000	2,409,535	769,819
Buffalo, Rochester & Pittsburgh	567	3,318,976	463,469	4,002,875	481,897	796,986	44,567	1,021,433	63,804	2,402,687	1,594,188	458	65,000	1,529,646	663,662
Central R.R. of New Jersey	668	7,284,437	2,068,194	9,882,758	907,083	1,590,343	156,401	2,574,214	206,779	5,434,820	4,447,938	201,636	448,021	4,201,552	696,919
Chicago Great Western R.R.	1,486†	2,257,788	659,267	3,162,174	341,155	335,323	113,806	1,197,321	94,709	2,082,315	1,079,859	—4,133	81,957	993,769	.....
Chicago, Indianapolis & Louisville	616	1,731,056	663,035	2,603,695	347,388	331,245	67,739	766,043	72,384	1,584,799	1,018,897	.....	101,000	917,897	250,473
Chicago, Rock Island & Gulf	529‡	978,601	325,291	1,367,186	200,505	93,952	30,350	458,975	43,578	827,361	539,825	—1,272	27,883	510,670	280,289
Cincinnati, Hamilton & Dayton	1,036	2,970,251	814,419	4,234,782	588,120	685,763	105,593	1,534,601	138,470	3,051,947	1,182,835	.....	129,167	1,053,668	319,470
Cleve., Cin., Chicago & St. Louis	1,982	8,216,963	3,402,560	12,711,101	1,492,717	1,929,316	400,689	4,347,943	223,758	8,394,423	4,316,678	—21,838	370,000	3,924,840	909,063
Denver & Rio Grande	2,553	7,384,837	2,734,072	10,555,445	1,315,305	1,543,656	214,139	3,539,000	227,520	6,839,620	3,715,825	39,039	334,000	3,420,864	390,179
Elgin, Joliet & Eastern	770	3,661,308	137	3,948,248	345,521	711,095	20,455	1,045,178	63,548	2,185,797	1,762,451	.....	67,500	1,694,951	721,508
Florida East Coast	583	463,535	295,374	882,577	157,505	177,346	20,596	375,348	39,189	769,984	112,593	.....	57,722	54,871	191,003
Fort Worth & Denver City	454	1,440,411	806,036	2,343,875	255,439	291,351	35,158	659,259	70,926	1,312,133	1,031,742	3,585	46,500	988,827	201,806
Grand Rapids & Indiana	587	1,230,697	847,051	2,220,225	252,677	333,160	55,413	828,611	66,808	1,536,670	683,555	—681	104,973	577,902	—27,321
Hocking Valley	350	2,835,685	416,486	3,353,990	449,266	592,742	37,426	846,664	60,552	1,986,650	1,367,341	90,634	108,540	1,349,435	268,576
Houston & Texas Central	789	1,915,858	659,574	2,739,135	318,100	264,359	87,614	941,696	96,504	1,708,273	1,030.862	.....	67,476	963,386	68,186
Lake Erie & Western	886	1,850,701	410,776	2,381,438	362,096	393,474	63,138	778,550	49,184	1,646,442	734,996	.....	91,712	643,284	255,042
Lake Shore & Michigan Southern	1,663§	13,771,164	4,900,105	20,886,419	2,817,709	2,815,874	491,204	5,842,463	294,532	12,261,782	8,624,637	—31,017	625,000	7,968,620	1,635,487
Louisville & Nashville	4,542‡‡	15,592,925	4,602,167	21,465,413	2,404,471	3,303,548	437,021	6,203,181	414,367	12,762,588	8,702,825	—51,545	626,285	8,024,995	1,686,186
Maine Central	932	2,263,201	1,511,598	4,007,329	633,579	513,565	40,113	1,236,322	99,602	2,523,181	1,484,148	21,748	174,168	1,331,727	249,913
Michigan Central	1,746	8,102,876	3,273,738	12,480,047	1,710,638	1,530,637	337,947	4,140,739	196,671	7,916,632	4,563,415	—11,191	473,000	4,079,224	1,022,149
Mobile & Ohio	1,114	3,154,714	563,425	4,306,193	522,139	740,982	141,142	1,386,728	152,862	2,943,853	1,362,340	—12,818	111,217	1,238,305	—22,151
New York Central & Hudson River	3,587	24,181,465	13,800,449	42,181,033	5,682,443	6,536,717	1,066,659	13,927,047	815,578	28,028,444	14,152,589	142,156	1,951,916	12,342,829	2,027,916
New York, Chicago & St. Louis	559	3,587,374	708,501	4,446,399	380,329	453,360	239,806	1,581,324	67,278	2,722,097	1,724,302	—4,799	165,000	1,554,504	419,785
Norfolk & Southern	592	691,296	312,374	1,091,545	128,664	134,510	21,362	329,990	69,789	684,225	407,320	2,659	29,500	380,480	142,214
Northern Pacific	5,691‖	22,178,983	11,543,093	35,681,803	4,794,620	3,915,149	409,460	9,821,874	455,170	19,396,273	16,285,530	349,739	1,355,909	15,279,360	668,403
Oregon R.R. & Nav. Co.	1,327¶	4,290,779	2,131,147	6,787,365	687,353	457,488	154,761	1,900,746	157,662	3,358,010	3,429,355	9,792	260,952	3,178,195	670,351
Philadelphia & Reading	1,024°	14,343,746	2,968,645	18,073,443	1,400,249	3,951,773	190,984	5,126,722	292,175	10,961,903	7,111,540	55,818	367,245	6,800,113	80,911
Rutland	468	795,226	551,150	1,491,676	233,791	190,763	33,352	485,073	26,707	969,686	521,990	.....	50,891	471,099	1,876,144
Pittsburgh & Lake Erie	191	6,832,928	658,240	7,676,513	711,547	552,991	69,607	1,453,438	99,649	2,887,232	4,789,281	—1,625	83,000	4,704,656	—143,004
Toledo & Ohio Central	441	1,500,156	297,832	1,876,263	260,773	287,976	28,381	544,898	31,096	1,153,124	723,139	57,838	69,363	711,614	—22,600
Trinity & Brazos Valley	455δ	817,997	91,483	926,550	164,199	171,751	25,320	408,348	50,787	820,405	106,145	.....	21,250	84,895	755,258
Wabash	2,515	8,329,929	3,336,097	12,584,901	1,532,944	1,646,053	385,760	4,358,675	320,965	8,244,397	4,340,504	—6,849	333,601	4,000,054	321,198
Wheeling & Lake Erie	458△	2,597,474	273,792	3,092,771	305,279	723,011	37,202	974,559	72,406	2,112,457	980,314	30,492	115,927	894,879	

* From July 1, 1909, includes Cleveland, Lorain & Wheeling Ry., previously reported independently. † Begun operations Sept. 1, 1909; consolidation of Chicago Great Western Ry., Mason City & Fort Dodge, Wisconsin, Minnesota & Pacific. ‡ Mileage operated on Nov. 30, 1908, 492. § Mileage operated on Nov. 30, 1908, 1,508. ‡‡ Includes Louisville & Atlantic from July 1, 1909, and Frankfort & Cincinnati from Nov. 1, 1909, both previously reported independently. ‖ Mileage operated Nov. 30, 1908, 5,649. ¶ Mileage operated on Nov. 30, 1908, 1,264. ° Mileage operated on Nov. 30, 1908, 1,006. δ Mileage operated Nov. 30, 1908, 422. △ Mileage operated on Nov. 30, 1908, 442. — Indicates Deficits, Loss, and Decreases.

Indiana: Adoption of Uniform Demurrage Rules.

Indiana Manufacturers' and Shippers' Association v. Indiana Car Service Association et al.

The petition asks that the railways of Indiana be required to adopt the uniform demurrage rules recommended by the National Association of Railway Commissioners. The commission finds that these rules are fair and reasonable and that the business of the country demands uniform demurrage rules, and therefore orders the railways doing an intrastate business to adopt the rules recommended by the National Association of Railway Commissioners.

Indiana: Electric Headlights Ordered.

In re condition and efficiency of locomotive headlights.

The commission of Indiana, ordered last year by the legislature to investigate locomotive headlights, has ordered all roads to use them. * * * The railway companies, having appeared and having co-operated and assisted the commission in this investigation, and the commission having examined a great many managers, superintendents, master mechanics, locomotive engineers and trainmen, and having corresponded with the authorities of the states of the Union where this matter has been considered, and having consulted railway men within and without the state and having taken scientific and expert advice, and especially the counsel of the dean of the Schools of Engineering and professors in said schools of Purdue University (a series of physical experiments and tests having been conducted under the direction of said dean), and the commission having made personal investigation by its members on the railways and on locomotives using both oil and electric headlights and being fully advised and after full and laborious consideration, the commission finds:

The oil headlights commonly in use on locomotive engines in this state are inadequate for the protection of persons and property; and that headlights of greater illuminating power would be the most practicable and efficient for all purposes.

It is therefore ordered that every railway * * * shall equip all engines with headlights of not less than 1,500 candle power (switching engines excepted); one-third of the road engines by the 1st of July, 1910, an additional third by the 1st of January, 1911, and the remaining third by the 1st of July, 1911. The railway companies are required to report to the commission the progress they make.

COURT NEWS.

The Baltimore & Ohio Southwestern on January 5 paid a fine of $1,000 in the circuit court at Springfield, Ill., for alleged discrimination in rates in violation of the Illinois state law. The charge was that it made a lower rate on grain from Pleasant Plains to East St. Louis than from Richland to East St. Louis, although the haul from the latter point is shorter.

At Jersey City, N. J., January 6, the Erie Railroad was fined $1,000 for maintaining a nuisance in the burning of soft coal in its locomotives.

In the supreme court of New York, Suffolk county, January 7, a suit of the state forest commission against the Long Island Railroad to recover penalties for failure to cut brush and weeds on the railway company's right-of-way ended in a verdict against the railway. The jury assessed the penalty at $32,200.

Commission Sustained in Distributing Coal Cars.

The supreme court of the United States in a decision by Justice White, January 10, decides the case of the United States against the Illinois Central and the Chicago & Alton, doing business in the Illinois coal mining district, in favor of the government. The case involved the right of the Interstate Commerce Commission to direct the distribution of cars in the interest of independent coal companies and the commission is upheld. In effect the court held that the fuel cars of other companies were to be counted in the quota of each particular mine.

The court declared that the commission was right in the exercise of its administrative functions in disregarding an injunction issued by a federal circuit court to restrain it from carying out its order. The opinion was written by Justice White, who spoke for the entire court except Justice Brewer, who dissented.

In the distribution of empty cars to the mines in times of car shortage the railways have divided the cars into four classes, namely: Those owned by the railways, those used for carrying fuel for the road making the distribution, those owned by the mine, the shipper or the consumer, known as private cars, and cars sent in by other roads for the transportation of their own fuel.

In the pro rata distribution based on either capacity or output of the mines it was usual to count those of the first class in making up the percentages, but make exceptions in the case of one or more or all of the other classes.

The first test case of distribution was brought by the Ohio Railroad Commission in 1907, the Interstate Commerce Commission deciding that the failure of the Hocking Valley road to include foreign railway fuel cars and private cars in the pro rata was a discrimination prohibited by the Interstate Commerce Act. The Illinois Central a few days later put into effect regulations in conflict with this decision and was about to make them conform to the decision when the Majestic Coal Company obtained an injunction against the road.

Then the Illinois Collieries Company made complaint to the commission that the distribution made by the Illinois Central was discriminatory and the commission ordered the road to include private and railway fuel cars, the injunction to the contrary notwithstanding. The company went into court for an order enjoining the commission from enforcing its order, setting up among other things the order of the other court in the Majestic case.

The circuit court, however, found against the road with regard to private cars and foreign fuel cars but against the commission with regard to the cars carrying fuel for the Illinois Central, holding that as the coal was not for commercial purposes it could not be treated as being engaged in commerce. The commission appealed from the last part of the finding.

In announcing the decision this week Justice White considered an objection concerning the delegation of power to the commission, that no such delegation had been made by the interstate commerce law in regard to the distribution of fuel cars as a means of prohibiting unjust preferences and undue discrimination, and the second, that even if such power should be delegated the order was beyond the authority conferred by law. The objection, he said, rested on the erroneous assumption that commerce, in the constitutional sense, embraced only shipment in a technical sense. The cars and engines of a railway company engaged in interstate commerce, included in which are its coal cars, are instruments of such commerce. From this it necessarily follows that such cars are embraced within the governmental power of regulation, which extends, in time of car shortage, to compelling a just and equal distribution and the prevention of an unjust and discriminatory one.

In the suit as originally instituted the courts were asked to enjoin the enforcement of the Interstate Commerce Commission's order as it applied to the distribution of the fuel cars of foreign railways and private cars of other shippers, as well as the cars employed by the initial railway companies themselves in hauling their own fuel. The United States Circuit Court for the Northern district of Illinois sustained the commission with reference to the first two classes, but granted an injunction restraining the enforcement of the regulation with reference to the company owned cars. This, therefore, was the only point involved in the present decision, and on that point the supreme court reversed the trial court, in addition announcing in broad terms its support of the power of the commission.

The case of the Baltimore & Ohio against the Pitcairn Coal Company involving a complaint of unequal distribution of cars by independent coal operators in West Virginia, was technically decided in favor of the railway company on the ground that the complaint should have been made originally to the Interstate Commerce Commission instead of to the courts.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

H. E. Peyton has been appointed assistant to the president of the Louisville & Nashville, with office at Louisville, Ky.

W. H. Larson has been elected secretary-treasurer of the Alexandria & Western, a new line under construction in Louisiana.

J. W. O'Neal has been appointed assistant auditor of freight receipts of the Pennsylvania Lines West, with office at Pittsburgh, Pa., succeeding W. Parker, retired.

F. H. Wood, assistant attorney of the Kansas City Southern at Kansas City, Mo., has been appointed a general attorney of the St. Louis & San Francisco, with office at St. Louis, Mo.

As was previously announced in these columns, Darius Miller, first vice-president of the Chicago, Burlington & Quincy, in charge of traffic, on the retirement of Daniel Willard, second vice-president, in charge of operation, to become president of the Baltimore & Ohio, has his jurisdiction extended to include the operating department. Mr. Miller was born April 3, 1859, at Princeton, Ill. He began railway work in November, 1877, as a stenographer in the general freight office of the Michigan Central at Chicago. He was then consecutively clerk in the general freight office of the St. Louis, Iron Mountain & Southern; chief clerk to the general manager and then general freight and ticket agent of the Memphis & Little Rock, now a part of the Chicago, Rock Island & Pacific. He left this road to become general freight and passenger agent and then traffic manager of the St. Louis, Arkansas & Texas, now a part of the St. Louis Southwestern. He was later traffic manager of the Queen & Crescent, and then traffic manager of the Missouri, Kansas & Texas. He was elected vice-president of the latter road in September, 1896, and two years later was elected second vice-president of the Great Northern. In January, 1902, he was elected first vice-president of the Chicago, Burlington & Quincy, and his jurisdiction was extended over the Colorado & Southern in March, 1909, after the Burlington acquired control of this property from the Hawley interests.

Darius Miller.

William Mahl, vice-president and comptroller of the Union Pacific and Southern Pacific systems, has been elected president of the Texas & New Orleans, at New York, succeeding E. H. Harriman, deceased. A sketch of Mr. Mahl's railway life was published in our issue of October 29, page 824.

G. W. Kretzinger, general counsel of the Chicago, Indianapolis & Louisville at Chicago, having resigned, that office is abolished, and E. C. Field, vice-president and general solicitor, with office at Chicago, will perform also the duties heretofore performed by the general counsel. H. R. Kurrie, assistant general solicitor, has been appointed general attorney at Chicago.

E. H. Fitzhugh, third vice-president of the Grand Trunk, has been elected first vice-president. William Wainwright, fourth vice-president, has been elected second vice-president; M. M. Reynolds, fifth vice-president, has been elected third vice-president, and R. S. Logan, assistant to second vice-president, has been appointed assistant to president, all with offices at Montreal, Que.

Barrett B. Mitchell, whose appointment as assistant to vice-president of the New York Central Lines at New York was recently announced in these columns, was born September 24, 1846, at Pittsford, Monroe county, N. Y. He was educated in the district public schools and at the Rochester high school. He began railway work June 1, 1867, as a clerk for the Blue line, a fast freight line owned and controlled by the New York Central and the Michigan Central, remaining with the Blue line until January, 1895, when he went to the Michigan Central as general freight agent. In November, 1905, he was made freight traffic manager of the New York Central lines west of Buffalo, with office in Chicago, and the following month was appointed freight traffic manager of the New York Central lines east, with office in New York. In May, 1906, he was appointed general freight traffic manager of the entire New York Central system, with office in Chicago, which position he held at the time of his recent appointment. Mr. Mitchell has been in continuous service with the New York Central interests for over 42 years.

B. B. Mitchell.

C. H. Ackert, vice-president and general manager of the Southern Railway at Washington, D. C., has been elected vice-president, in charge of operation, of the Toledo, St. Louis & Western, the Chicago & Alton, the Minneapolis & St. Louis and the Iowa Central, with office at Chicago. Mr. Ackert was born February 19, 1856, in Dutchess county, N. Y. He began railway work in 1872 with the St. Louis, Kansas City & Northern, now part of the Wabash, holding various positions with that company, the St. Louis, Iron Mountain & Southern and the Texas & Pacific until 1883, when he went to the Iowa Central. He was appointed general manager of the Iowa Central in 1888, which position he held until April, 1893, when he went to the Elgin, Joliet & Eastern as general manager, and later was made president of that company and of the Chicago, Lake Shore & Eastern. In March, 1901, he became general manager of the Mobile & Ohio. On March 15, 1902, he went to the Southern Railway as general manager and has been at the head of the operating department of that road ever since, becoming vice-president in 1905.

C. H. Ackert.

Operating Officers.

O. Cornelisen, general superintendent of the Chicago Great Western, at Chicago, has resigned.

F. H. Knickerbocker has been appointed assistant to the

general manager of the Oregon Short Line, with office at Salt Lake City, Utah.

W. G. Mason, assistant superintendent of the Texas & Pacific at Bunkie, La., has been appointed trainmaster of the New Orleans Great Northern, with office at Bogalusa, La.

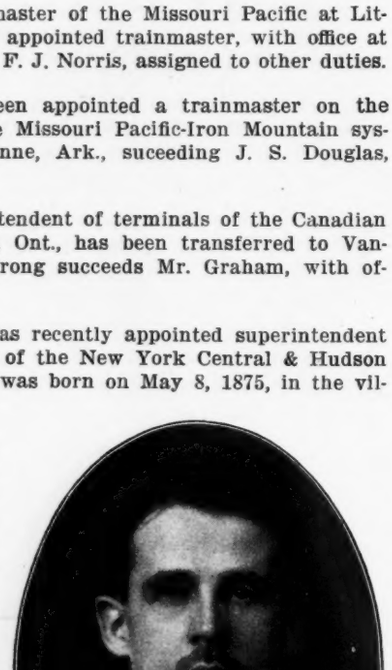
F. A. Andrews, yardmaster of the Bangor & Aroostook at Millinocket, Me., has been appointed trainmaster in charge of the Southern and Northern divisions, with office at Bangor, Me.

C. A. Clements, trainmaster of the Missouri Pacific at Little Rock, Ark., has been appointed trainmaster, with office at De Soto, Mo., succeeding F. J. Norris, assigned to other duties.

L. A. Wallace has been appointed a trainmaster on the Memphis division of the Missouri Pacific-Iron Mountain system, with office at Wynne, Ark., suceeding J. S. Douglas, resigned.

G. E. Graham, superintendent of terminals of the Canadian Pacific at Fort William, Ont., has been transferred to Vancouver, B. C. B. Armstrong succeeds Mr. Graham, with office at Fort William.

Miles Bronson, who was recently appointed superintendent of the Mohawk division of the New York Central & Hudson River at Albany, N. Y., was born on May 8, 1875, in the village of Gauhati, province of Assam, British India. He began railway work in June, 1890, in the law department of the Grand Trunk, at Detroit, Mich., and held various positions with that company until May, 1895, when he became secretary to S. R. Callaway, president of the New York, Chicago & St. Louis at Cleveland, Ohio. In 1897 he was appointed superintendent of the Buffalo Terminal, which was then under construction. Before the road was opened for business, however, Mr. Callaway went to New York to succeed C. M. Depew as president of the New York Central & Hudson River and Mr. Bronson became his secretary at New York, instead of going to Buffalo. He was later made assistant to the president. In November, 1900, he was appointed superintendent of the Harlem division, which position he held until March, 1907, when he was transferred to the River division, and is now transferred to the Mohawk division.



Miles Bronson.

E. H. Coapman, manager of the Southern at Washington, D. C., has been appointed general manager, succeeding to the duties as general manager of C. H. Ackert, vice-president and general manager, resigned, with office at Washington, in charge of the operating and maintenance departments, reporting to the president, and his former position has been abolished.

Frank H. Wilson, whose appointment as assistant general superintendent of the Lake Shore & Michigan Southern, with office at Chicago, has been announced in these columns, was born November 12, 1873, at Indianapolis, Ind. He received a common school education and began railway work in 1887 as messenger for the Indiana, Bloomington & Western, and for six years from 1888 he was clerk to the trainmaster and superintendent of that road and the Cincinnati, Indianapolis, St. Louis & Chicago, both of which roads are now parts of the Cleveland, Cincinnati, Chicago & St. Louis. He was then made secretary and chief clerk to the general superintendent of the Big Four, and in December, 1902, was appointed trainmaster of the Peoria & Eastern division. For a year from January, 1903, he was special representative of the general manager of the Lake Shore & Michigan Southern, and was then appointed trainmaster, with office at Toledo. In April, 1905, he was made assistant division superintendent at Chicago, and later in the same year was appointed superintendent of the Western division, from which position he has just been promoted.

The Minneapolis & St. Louis and the Iowa Central have been divided into three operating divisions. The Eastern division of the Minneapolis & St. Louis includes Minneapolis terminals and all trackage south of Hopkins and Winthrop, Minn., including Hopkins yard, but not Winthrop yard. C. P. Stembel, superintendent, with office at Minneapolis, has been appointed superintendent of the Eastern division only. The Western division includes all trackage west of Hopkins yard, and J. A. Swygart has been appointed superintendent, with office at Watertown, S. D. H. G. Kruse continues as superintendent of the Iowa Central, with office at Oskaloosa, Iowa. See item under Engineering and Rolling Stock Officers.

Traffic Officers.

Walter J. Moore has been appointed industrial agent of the New York Central lines, with office at New York.

H. F. Daniels has been appointed a commercial agent of the Norfolk & Western, with office at Memphis, Tenn., succeeding N. R. Prichard.

Richard Warren has been appointed general agent of the El Paso & Southwestern and the Morenci Southern, with office at El Paso, Tex.

J. H. Brown has been appointed traffic manager of the Las Vegas & Tonopah, with office at Los Angeles, Cal., succeeding E. W. Gillett, resigned.

Thomas F. Shea has been appointed soliciting agent of the Louisville & Nashville, with office at Atlanta, Ga., succeeding M. C. Browning, transferred.

F. E. Rownd, soliciting freight agent of the St. Louis Southwestern at St. Louis, Mo., has been appointed a traveling freight agent, with office at St. Louis. H. W. McKee succeeds Mr. Rownd.

H. F. Ledlie, commercial agent of the Lake Shore & Michigan Southern at Kansas City, Mo., has been appointed division freight agent of that road and the Pittsburgh & Lake Erie, with office at Youngstown, Ohio.

James S. Bartle, general eastern freight agent of the Atchison, Topeka & Santa Fe at New York, has been appointed assistant freight traffic manager, with office at Chicago, succeeding F. B. Houghton, promoted.

J. A. Martin, general eastern agent of the Minneapolis & St. Louis and the Iowa Central at New York, has been appointed assistant general eastern agent of the Chicago, Burlington & Quincy, with office at New York.

A. J. Parr, assistant freight and passenger agent of the Temiskaming & Northern Ontario at North Bay, Ont., has been appointed freight and passenger agent of this company, with office at North Bay, succeeding W. D. Cunneyworth, resigned.

H. P. Bonner, traveling freight agent of the Trinity & Brazos Valley at Dallas, Tex., has been appointed commercial agent of this company, with office at Galveston, Tex., succeeding J. I. Johnson, resigned to accept service with the Rock Island.

J. E. Bell, traveling freight agent of the Chicago, Rock Island & Pacific at Atlanta, Ga., and J. I. Johnson have been appointed commercial agents, and A. W. Terrell has been appointed a traveling freight agent of the Rock Island lines, all with office at San Antonio, Tex.

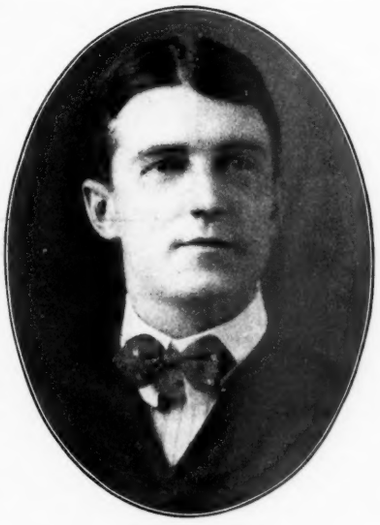
E. F. Tillman, joint live stock agent of the Rock Island-

'Frisco system at Ft. Worth, Tex., has been appointed live stock agent of the St. Louis & San Francisco, with office at Ft. Worth, following the dissolution of this system. S. M. Wallace and C. W. Root have been appointed traveling freight agents, both with office at Dallas, Tex.

Stuart A. Allen, general southern freight agent of the Cincinnati, Hamilton & Dayton at Cincinnati, Ohio, has been appointed assistant general freight agent, with office at Cincinnati, and his former office has been abolished. H. G. Alexander, city passenger agent at Indianapolis, Ind., has been appointed district passenger agent, with office at Indianapolis, succeeding F. E. Hine, resigned to engage in other business. George B. Peterson succeeds Mr. Alexander.

The agencies of the Toledo, St. Louis & Western and the Chicago & Alton, and that of the Minneapolis & St. Louis and the Iowa Central at New York have been consolidated, and A. K. Handy, general eastern freight agent of the Toledo, St. Louis & Western and the Chicago & Alton, has had his jurisdiction extended to include all four roads. J. A. Martin, general eastern agent of the Minneapolis & St. Louis and the Iowa Central, has resigned to accept service elsewhere.

W. E. Coman, whose appointment as general freight agent of the Oregon Railroad & Navigation Company, with office at Portland, Ore., has been announced in these columns, was born May 15, 1869, at Portage, Wis. He received a common school education and began railway work in September, 1886, at Kansas City, Mo., in the local office of the Hannibal & St. Joseph, now a part of the Chicago, Burlington & Quincy. He was later until 1888 with the Chicago, Rock Island & Pacific and the Kansas City, Ft. Scott & Memphis, now a part of the St. Louis & San Francisco. He then went to Portland, Ore., where he began work with the Oregon Railroad & Navigation Company, first in the local freight office, and he was afterwards consecutively clerk in the general freight office, assistant chief clerk in the general freight office, traveling freight agent, general agent at Butte, Mont.; general agent of the Oregon Short Line at Portland, and general agent of the Oregon Short Line and the Union Pacific at Salt Lake City, Utah. In September, 1901, he was appointed assistant general freight agent of the Oregon Railroad & Navigation Company at Portland, and in the following year was made general freight and passenger agent of the Southern Pacific Lines in Oregon. In September, 1905, he was appointed first assistant general freight agent of the Oregon Railroad & Navigation Company, from which position he has been promoted to general freight agent.



W. E. Coman.

Gentry Waldo, general agent of the Southern Pacific Steamship Company at Galveston, Tex., has been appointed an assistant general freight agent of the Galveston, Harrisburg & San Antonio, the Houston & Texas Central, the Houston East & West Texas and the Houston & Shreveport, with office at Houston, Tex., succeeding H. C. Reese, deceased. H. M. Wilkins, general agent in the freight department of the rail lines mentioned, at Galveston, succeeds Mr. Waldo. R. H. Carmichael, general agent of the Southern Pacific lines at Monterey, Mex., suceeds Mr. Wilkins. J. C. Brasher, chief clerk in the freight traffic department at Houston, has also been appointed an assistant general freight agent, with office at Houston, a newly created office. S. G. Reed, division freight agent of the Houston & Texas Central at Dallas, Tex., has been appointed as assistant general freight agent of that road, with office at Dallas.

John Frederick Auch, whose appointment as freight traffic manager of the Philadelphia & Reading and subsidiary companies, with office at Philadelphia, Pa., was recently announced in these columns, was born in Montgomery county, Pa. He began railway work in October, 1875, with the Philadelphia & Reading as night operator at West Spring Mills, Pa., later alternating between day and night service at various places until the fall of 1879, when he was appointed station agent at Chalfont, Bucks county, Pa. In the summer of 1885 he was appointed chief clerk to the division freight agent of the Philadelphia & Atlantic City, a part of the Reading system, with office at Philadelphia, Pa. From 1886 to 1888 he was division freight agent at the same place, and in 1888 was appointed traveling freight agent for the Reading. The following year he was made chief clerk to the general freight agent, and in April, 1891, was made division freight agent at Harrisburg, Pa. Three years later he was appointed assistant general freight agent, with office at Philadelphia, and on May 1, 1908, was made general freight agent. He was appointed assistant freight traffic manager December 1, 1909, and now is promoted to the position of freight traffic manager.

John F. Auch.

Richard B. Miller, whose appointment as traffic manager of the Oregon Railroad & Navigation Company and the Oregon & Washington, with office at Portland, Ore., has been announced in these columns, was born April 8, 1870, in Idaho. He received a common school education and began railway work in 1886 with the Oregon Railroad & Navigation Company. He was appointed assistant general freight agent of that road on October 1, 1897, and four years later was made assistant general freight and passenger agent of the Southern Pacific Lines in Oregon. He was appointed general freight agent of the Oregon Railroad & Navigation Company in May, 1902, and in September, 1905, had his jurisdiction extended over the Southern Pacific Lines in Oregon, which position he held until his recent promotion. Mr. Miller retains the title of general freight agent of the Southern Pacific Lines in Oregon.

R. B. Miller.

M. J. McDonough, commercial agent of the Seaboard Air Line at Birmingham, Ala., has been appointed assistant general freight agent, with office at Birmingham, succeeding E. T. Steele, resigned. R. W. Morris, traveling freight agent at Birmingham, succeeds Mr. McDonough. S. K. Hawkins also has been appointed a commercial agent at Birmingham. C. J.

Nalle has been appointed a soliciting freight agent, with office at Memphis, Tenn., succeeding Edgar Estile, resigned.

C. B. Sloat, general agent of the Chicago, Rock Island & Pacific at Kingsville, Tex., has been appointed an assistant general passenger agent, with office at Little Rock, Ark., where he will succeed to the duties of G. H. Lee, general passenger agent, promoted. E. J. O'Neill, commercial agent of the Chicago, Rock Island & Pacific at St. Louis, Mo., has been appointed general agent, with office at St. Louis. G. A. Carter, general agent of the Missouri, Kansas & Texas at Dallas, Tex., has been appointed a traveling freight agent of the Rock Island, with office at Fort Worth, Tex. B. D. Shropshire, Jr., has been appointed a soliciting freight agent, with office at Fort Worth.

Following the dissolution of the Rock Island-Frisco merger, the appointments in the freight traffic department of the Rock Island Lines are as follows: John Fox has been retained as live stock agent, with office at Kansas City, Mo.; R. O. Roy, Alexandria, La.; C. H. Caswell, Davenport, Iowa; A. W. Eberhart, Des Moines; M. M. Knapp, Estherville; J. B. Rishel, Hutchinson, Kan.; P. Portel, Oklahoma City, Okla.; E. F. Strain, Topeka, Kan., and E. B. Hooser, Wichita, have been retained as division freight agents. S. L. Parrott, Boston, Mass.; W. A. Kendall, Burlington, Iowa; G. W. Martin, Denver, Colo.; J. Mallen, Leavenworth, Kan.; De Witt Hammond, Mexico City, Mex.; W. A. Hughes, Milwaukee, Wis.; J. E. Utt, Omaha, Neb.; H. I. Battles, Peoria, Ill.; O. M. Ellsworth, Pittsburg, Pa.; C. A. Hunter, Portland, Ore.; J. G. Doolittle, Salt Lake City, Utah, and G. P. Cave, Seattle, Wash., have been retained as general agents. F. M. Darrah, Atchison, Kan.; V. M. Cluis, Atlanta, Ga.; E. C. Hines, Boston, Mass.; A. S. Collins, Buffalo, N. Y.; W. S. Williams, Cedar Rapids, Iowa; C. C. Spalding, Cincinnati, Ohio; G. W. Teare, Cleveland; A. R. Brasted, Colorado Springs, Colo.; G. W. Williams, Detroit, Mich.; Fred Smith, Kansas City, Mo.; E. O. Miller, Lincoln, Neb.; R. E. Smith, Little Rock, Ark.; B. F. Coons, Los Angeles, Cal.; T. A. Matthews, Jr., Minneapolis, Minn.; E. J. Hennessey, Omaha, Neb.; D. W. Farrow, Philadelphia, Pa.; C. H. Bacon, Pueblo, Colo.; E. L. Goff, Rock Island, Ill.; W. T. Allen, San Francisco, Cal.; R. F. Atwood, St. Joseph, Mo., and J. B. Rayn, St Paul, Minn., have been retained as commercial agents. O. C. Turlington, traveling freight agent at Little Rock, Ark., has been appointed a commercial agent at New Orleans, La., succeeding I. T. Preston, resigned. M. L. Hartley succeeds Mr. Turlington. T. W. Bennett has been appointed a commercial agent at Louisville, Ky., succeeding C. S. Hall, resigned, and F. C. Johnson has been appointed a commercial agent at Memphis, Tenn., succeeding J. H. Doughty, resigned. L. D. Voak, Chicago, has been retained as traveling freight agent, and R. N. Gordon, Tacoma, Wash., has been retained as traveling freight and passenger agent. F. B. Mesick, general eastern freight agent at New York, and F. W. Thompson, general western freight agent, at San Francisco, Cal., have been retained. Freight agencies at the following points have been abolished: Birmingham, Ala.; Fort Smith, Ark.; Chicago Heights, Ill., Danville, National Stock Yards and Salem; Evansville, Ind., and Terre Haute; Fort Scott, Kan.; Cape Girardeau, Mo.; Joplin and Springfield; Sapulpa, Okla.; Chattanooga, Tenn., and Nashville.

Engineering and Rolling Stock Officers.

George D. Fairtrace has been appointed chief engineer of the Bartlett & Florence Railway, with office at Bartlett, Tex.

C. M. Hoffman has been appointed master mechanic of the Denver & Rio Grande, with office at Grand Junction, Colo., succeeding F. B. Mahoney, resigned.

F. G. Jonah, terminal engineer of the New Orleans Terminal Company at New Orleans, La., has been appointed engineer of construction of the St. Louis & San Francisco, with office at St. Louis, Mo.

O. S. Jackson has been appointed master mechanic of the Chicago, Indianapolis & Louisville, with office at Lafayette, Ind. W. J. Bennett, assistant superintendent of motive power, having resigned to accept service elsewhere, that office is abolished.

Incident to the new operating organization of the Minneapolis & St. Louis and the Iowa Central (see item under Operating Officers), R. G. Kenly has been appointed engineer maintenance of way and structures, with jurisdiction over both roads. John Hill, master mechanic and master car builder of the Minneapolis & St. Louis at Minneapolis, Minn., has been appointed master mechanic of both the Eastern and Western divisions, with office at Minneapolis. John B. Kelly, general roadmaster at Minneapolis, has been appointed roadmaster of the Eastern division. J. H. Reinholdt, assistant to the chief engineer at Minneapolis, has been appointed roadmaster of the Western division. E. Gagnon, supervisor of bridges and buildings at Minneapolis, has been appointed supervisor of bridges and buildings of the Eastern division only, and J. P. Hixson has been appointed to a similar position on the Western division. C. E. Gossett, master mechanic, and S. J. Johnson, supervisor of bridges and buildings of the Iowa Central, both at Marshalltown, Iowa, retain their present titles, and M. H. Sheeley, general roadmaster at Marshalltown, has been appointed roadmaster.

Purchasing Officers.

H. C. Stevens, assistant to general storekeeper of the Atchison, Topeka & Santa Fe at Topeka, Kan., has been appointed supervisor of stores of the National Railways of Mexico.

Eugene McAuliffe, general fuel agent of the Rock Island-Frisco lines at Chicago, has resigned from the Rock Island and has been appointed general fuel agent of the St. Louis & San Francisco, the Chicago & Eastern Illinois and the Evansville & Terre Haute, with office at Chicago.

OBITUARY.

William A. Gorman, general freight and passenger agent of the St. Louis, Rocky Mountain & Pacific, with office at Raton, N. Mex., died at Raton on January 5.

Hamilton McK. Twombly died at his home near Morristown, N. J., December 11, after an illness of more than a month. He was born in Boston in 1849 and graduated from Harvard University in the class of 1871. A few years later he entered the office of the late William H. Vanderbilt, then president of the New York Central & Hudson River. In 1877 he married Florence Vanderbilt, William H. Vanderbilt's daughter. He was made a director of various New York Central Lines, and on the death of William H. and the succession of William K. Vanderbilt as the head of the Vanderbilt interests, Mr. Twombly became more and more the personal representative of William K. Vanderbilt on the various boards of directors of the New York Central Lines. During Mr. Vanderbilt's frequent absences in Europe Mr. Twombly was considered as expressing authoritatively the Vanderbilt wishes on disputed questions, so that although Mr. Twombly was not an officer of the New York Central Lines, he was nevertheless influential in their management. He was a director of about 60 companies, most of which were railway companies. Among the more important beside the New York Central Lines were the Chicago & North Western, the Chicago, St. Paul, Minneapolis & Omaha, the Delaware, Lackawanna & Western, the Erie and the Philadelphia & Reading.

According to a report from Consul General Bartleman, at Buenos Ayres, Argentina, the Andine Railway has been sold by the Argentine government. The purchasers are the Pacific Railway, the Argentine Great Western Railway and the Central Argentine Railway. The purchase price was $11,602,859 United States currency. The line will be divided as follows: The Central Argentine Railway will have the section from Villa Maria to Rio Cuarto, including freight station; the Pacific will have the section from Rio Cuarto to Villa Mercedes to the junction with the Pacific main line; the Great Western, whose lines are being operated by the Pacific company, will get the section from the junction with the Pacific to Dolores. It is expected that the new owners of this railway will spend large sums of money in the near future on extensions and improvements, as this section of the country is rapidly developing.

Railway Construction.

New Incorporations, Surveys, Etc.

ABERDEEN & ROCKFISH.—A new branch, called the Wagram branch, has been opened from Raeford, N. C., north to Wagram, 12 miles.

ALBERTA & GREAT WATERWAYS.—An officer is quoted as saying that it is expected to begin work this spring. Surveys are now being made and about 200 miles of grading are expected to be finished this year. Contracts said to be let to the McInnis Lumber Co., Edmonton, Alb., for 340,000 ties, 500,000 ft. bridge timber, 150,000 ft. culvert timber and 140,000 fence posts for the first hundred miles, and for similar work on 50 miles to James Walker, Fort Saskatchewan. This will carry the line north to Lac La Biche. Work was started in December at a point 35 miles north of Edmonton. The company was organized last year with a capital of $7,000,000 and office at Edmonton, to build from Edmonton northeasterly to a point near the west end of Lac La Biche, thence north to a point near Fort MacMurray, on the Athabaska river, with a branch from this line near the west end of Lac La Biche to the east end of the lake, and a number of other branches, in all about 350 miles. The incorporators include: W. R. Clarke and B. R. Clarke, Kansas City, Mo.; William Bain, Winnipeg, Man. (Nov. 26, p. 1036.)

ALBERTA CENTRAL.—Organization of this company is said to have been completed and surveys made for the first 75 miles. The plans call for a line from Red Deer, Alb., westerly to a junction with the Grand Trunk Pacific in the Yellow Head Pass country. An extension is to be built from Red Deer easterly to Moose Jaw, Sask., with a branch from this line near the Battle river to Saskatoon or Warman. J. T. Moore, president; J. G. MacGregor, chief engineer, Red Deer. (Dec. 10, p. 1166.)

AMERICAN CENTRAL.—An officer writes that this company proposes to build a line from Winnipeg, Man., to the Gulf of Mexico. The first work to be carried out will be from Miami, Tex., southeast via Mobeetie and Wheeler to Texola, Okla., and through Mangam and Olustee to Vernon, Tex., 160 miles. It is expected to begin work early this coming spring. The route is through a prairie section, mostly level, and the grading work will be easy. The Central Construction Co., with office at Mobeetie, has been organized with $50,000 capital to make the surveys, locate the line and to organize and charter the company. Surveys will be started this month by J. B. Taylor & Co., New York. They will also build and equip the line. W. E. McClintock, chief engineer; M. F. Johnson, secretary of the Central Construction Co., Mobeetie. (Dec. 10, p. 1166.)

ATCHISON, TOPEKA & SANTA FE.—On the Arkansas River division a new line has been opened for business from Lamar, Colo., to Kornman junction, five miles.

ATLANTIC COAST LINE.—According to press reports plans are being made to build an extension from the proposed southern terminus of the Winston-Salem Southbound at Wadesboro, N. C., west to Charlotte. The W.-S. S. is being built by the Atlantic Coast Line and the Norfolk & Western jointly, from Winston-Salem, N. C., south to Wadesboro, 88 miles. O. H. P. Cornell, chief engineer of W.-S. S., Winston-Salem.

BOSTON & MAINE.—According to press reports this company is planning improvements to include a tunnel under Washington street in Salem, Mass. A new station south of the present station may be built at Salem. The old tunnel is to be enlarged and modern appliance for ventilation installed. The cost of these improvements is estimated at $2,000,000. Six miles of track on the Western division will be abandoned between New Market, N. H., and Madbury, and a new line with double-track will be laid, abolishing the large curve on the existing line. In rebuilding the section of the Gloucester branch between Squam river, Mass., and Gloucester station a new bridge will be put up over the stream. A new station is to be put up at Keene, N. H., to cost $50,000, as well as one at Charlemont, Mass., and another at Shelburne Falls, to cost $15,000 each. (Oct. 1, p. 612.)

BROWNWOOD NORTH & SOUTH.—An incorporator writes that a charter will be asked for and work will be started soon on a 30-mile line to connect May, Tex., with Rising Star. J. A. Walker, Brownwood, is interested.

CANADIAN PACIFIC.—Plans are said to be made for building a 50-mile extension in British Columbia. Bids are to be asked for early in February and work started the following month from a point on the Crow's Nest Pass line near Wardner station.

CHICAGO, ROCK ISLAND & PACIFIC.—According to press reports a large amount of money is to be spent for betterment work on the St. Louis-Kansas City line.

DENVER, NORTHWESTERN & PACIFIC.—This company is considering the building of a tunnel under the continental divide on its line now under construction. A subsidiary company has been organized to do the work, but plans have not been definitely decided on. Three general plans are under consideration: A 6.04 mile tunnel at elevation 9,100, a 4.70 mile tunnel at elevation 9,470, and a 2.70 mile tunnel at elevation 9,930.

DETROIT & MACKINAC.—The Hillman division has been opened for business from Alpina, Mich., westward to Hillman, 25 miles.

GARY, HOBART & VALPARAISO (ELECTRIC).—Most of the right-of-way is said to have been secured for a line from Gary, Ind., southeast via Hobart to Valparaiso, 20½ miles. Some of the grading has been finished. The line is eventually to be extended northwest about 25 miles additional to Laporte. A. Keator, Chicago, and B. A. Mapledoran, Laporte, may be addressed.

GILA VALLEY, GLOBE & NORTHERN.—See Southern Pacific.

GREAT NORTHERN.—On the Mesabi division, the Bovey line has been extended from Nashawauk, Minn., westward to Gunn, 22 miles.

The line from Keremos, B. C., to Princeton, 42 miles, is said to be open for freight traffic.

GREENVILLE, SPARTANBURG & ANDERSON (ELECTRIC).—Incorporated in South Carolina, with $300,000 capital and office at Greenville, S. C., to operate an electric line from Anderson, S. C., northeast to Spartanburg, about 65 miles. The tracks of the Anderson Traction Co. will form part of the line. The route from Anderson is to be north via Belton, Williamston, Pelzer and Piedmont to Greenville, thence east via Taylors, Chick Springs, Greer, Duncan, Wellford and Fairforest to Spartanburg.

KANKAKEE & URBANA TRACTION.—Financial arrangements are said to be partly made, and surveys finished, for a line from Kankakee, Ill., south via Urbana to Charleston, 125 miles. Contracts for this work may be let this spring. Plans made for a branch from Chebanse southwest to Piper City, 30 miles. W. J. Brock, president, and W. D. Moore, Jr., chief engineer, Kankakee. (Sept. 10, p. 478.)

KANSAS CITY, MEXICO & ORIENT.—Residents of Del Rio, Tex., have agreed to subscribe for $200,000 in bonds of the K. C., M. & O., in consideration of which the railway company is to finish the line from San Angelo south to Del Rio, about 140 miles, before January, 1913.

LOUISIANA & ARKANSAS.—The Shreveport district has been opened for business from Minden, La., west to Shreveport, 30 miles.

MEXICO NORTH WESTERN.—Work is said to be under way from Temosachic, Mex., north to Madera, 32 miles, replacing the 45-lb. rails with heavier sections.

MINNEAPOLIS & RAINY RIVER.—Passenger service has been extended from Bass lake, Minn., to Stanley, two miles.

MOUNTAIN VALLEY & PLAINS.—According to press reports work is to be started in March on this line. The projected route is from Guthrie, Okla., west to Cimarron, N. Mex., about 450 miles. J. H. Conlan, chief engineer, Dalhart, Tex. (Nov. 26, p. 1137.)

NEVADA-CALIFORNIA-OREGON.—Contract is said to have been given to Nugent & Richardson for grading an extension from

Alturas, Cal., north to Lake View, Ore., 50 miles. (Dec. 3, p. 1108.)

NEW MEXICO CENTRAL.—This company, formerly the Santa Fe Central, is said to have given a contract to Charles J. Lantry for extending the line to coal mines in Hagen, N. Mex., 40 miles east of Albuquerque; also to extend the line into Albuquerque. Most of the grading has been finished. (Oct. 29, p. 828.)

NEZ PERCE & IDAHO.—This company is said to be arranging a sale of bonds to secure funds to complete the line from Nez Perce, Idaho, to Vollmer. The company was organized in September, 1908, with $500,000 capital and has grading and bridge work finished on one mile. It is expected to have the line in operation by March, 1910. Z. A. Johnson, president and general manager, Nez Perce.

OMAHA, WESTERN & LINCOLN.—Incorporated in South Dakota, with $3,000,000 capital and office at Lincoln, Neb., to build from Omaha southwest to Hastings, 200 miles, with a branch south to Lincoln. The incorporators include: F. L. Schaaf and C. Lee, Lincoln; A. P. Tilley, Osceola; C. Butler, Kenesaw, Neb., and E. J. Quirk, Highmore, S. Dak.

OREGON RAILROAD & NAVIGATION CO.—According to press reports the authorized work to be caried out by this company includes a new line between Yoakum, Ore., and Pendleton, 12½ miles. The plans call for a tunnel about 1,100 ft. long. There will be two crossings over the Umatilla river, which will necessitate putting up permanent steel structures, each having two spans of about 150 ft.

PITTSBURGH & SHAWMUT.—See Pittsburgh, Shawmut & Northern.

PITTSBURGH, SHAWMUT & NORTHERN.—Work is said to be under way by the J. H. Corbett Construction Co., Moncton, N. B., and Kittanning, Pa., on the north end of the Mauk tunnel, which is to be 1,930 ft. long, on the extension of the Pittsburgh & Shawmut. It is said that it will take about two years to complete this work. The line is being extended from Knoxdale, Pa., south along Mahoning creek to Mahoning, thence over the Allegheny river, where a large bridge will be built, and along the west bank of that river to Freeport. W. W. Henshey, chief engineer, Kittanning. (Sept. 24, p. 562.)

RICHMOND & CHESAPEAKE BAY (ELECTRIC).—According to press reports surveys are now under way from Ashland, Va., north to Fredericksburg, and will be continued to Washington, D. C. (Dec. 24, p. 1261.)

ROCKINGHAM RAILWAY.—An officer writes that this company was organized to build a line to connect Rockingham, N. C., with the Atlantic Coast Line at Gibson City or some other point, between 20 and 25 miles long. Engineers are now at work and it is expected to begin construction during March. J. P. Leak, president, Rockingham.

ROSWELL NORTHERN & GULF.—Incorporated in New Mexico, with $150,000 capital, to build from Tucumcari, N. Mex., north about 100 miles. The incorporators include: C. C. Tannehill, Alvin, Tex.; R. Morrison, Philadelphia; J. F. Hinkle, E. L. Bedell and J. Smith.

SOUTHERN PACIFIC.—A contract is said to have been given to Grant Brothers for heavy tunnel work on an extension of the Phoenix & Eastern northeast to San Carlos, Ariz.

The Gila Valley, Globe & Northern has opened a branch from Globe, Ariz., southward to Miami, 10 miles.

SOUTHERN PACIFIC OF MEXICO.—The line from Corral, Mex., north to Tufanito, has been extended north to La Dura, 19 miles.

SUWANNEE RIVER & WHITE SPRINGS.—An officer writes that this company has finished work from Live Oak, Fla., east to Pine Grove, nine miles, and is carrying out work with its own forces on an additional nine miles from Pine Grove to White Springs. W. L. Tedder, president and general manager, Live Oak.

TEHUANTEPEC NATIONAL.—According to a press despatch from the city of Mexico this company has such a heavy through freight traffic between its Atlantic and Pacific termini that plans for the double-tracking of the line have been made and submitted to the Mexican government for approval. The line is 193 miles long and traverses a comparatively level country. It is operated under lease by S. Pearson & Son, Ltd., of London, England. In rebuilding the line a few years ago the cost was shared equally by the government and by S. Pearson & Son, Ltd.

TEXAS ROADS (ELECTRIC).—According to press reports from Galveston, Tex., C. L. Hodges, Chicago, and L. L. McSweeney, New York, represent a syndicate with $26,000,000 capital, organized to build electric lines in Texas. Work is to be started within 90 days.

TUSCARORA RAILROAD.—See Tuscarora Valley.

TUSCARORA VALLEY.—This company, now operating a line from Port Royal, Pa., southwest through Tuscarora valley to Blairs mills, in Huntingdon county, is planning to build an extension under the name of the Tuscarora Railroad, from Blairs Mills to a point in the southern part of Fulton county, near Licking creek, about 45 miles.

VIRGINIAN.—Train service on the Winding Gulf branch has been extended from Patterson, W. Va., to Winding Gulf, three miles.

WAUTAUGA RAILROAD.—According to press reports from Charlotte, N. C., about $200,000 has been spent securing right-of-way for a line from Northwilkesboro, N. C., west to Butler, Tenn., 50 miles. F. R. Linney, E. Coffey and other capitalists of western North Carolina are back of the project.

WINSTON-SALEM SOUTHBOUND.—See Atlantic Coast Line.

WISCONSIN & NORTHERN.—This company is said to have rejected all bids for the construction of the proposed extension from Shawano, Wis., south to Appleton and Neenah. It is understood that the work is indefinitely postponed.

WYOMING RAILWAY.—Incorporated in Wyoming, to build from Clearmont, Wyo., on the Chicago, Burlington & Quincy, southwest to Buffalo, 32 miles. Plans are said to be made to build the line at a cost of about $1,000,000. It is the intention of the company to ultimately extend the line south to a point near Casper, on the Chicago & North Western. Fred Hess, Buffalo, Wyo., is now in Denver, Colo., completing financial arrangements. (See Wyoming Roads, Sept. 3, p. 427.)

FOREIGN RAILWAY NOTES.

It is proposed to build a railway from Lgow, Russia, in the government of Kursh, to Riga, about 500 miles. The object of this line is to open the territory between the two parallel lines, Riga-Orel and Libau-Romny. Surveying will begin at an early date.

The railway department of the Argentine government has been authorized to build a line between Diamante and Crespo. Surveys are also being made for the line from Curuzú Cuatiá to connect with the line from Monte Caseros to Posadas, and for a line from the port of Paraná to Maria Grande. It is said that $289,500 United States currency has been given to this department for this work.

Minister W. F. Sands, at Guatemala City, Guatemala, has been making investigations concerning the proposed connection between the Guatemala Railway and the Pan-American branch of the railways of Mexico. The following statement has been issued by D. B. Hodgsdon, general manager of the Guatemala Central, in this connection: "Concerning the extension of our line towards the frontier of Mexico, we have a surveying party in the field, and it will probably require two or three months to finish the running of the preliminary line incidental to making the final location for the road. As regards supplying materials, our purchasing department in the United States will have exclusive charge of the purchasing of everything that will be required for said line, and all inquiries should be directed to that office. As to construction work, we hope to get organized and under good headway during the dry season now opening up.

Railway Financial News.

BALTIMORE & OHIO CHICAGO TERMINAL.—This is the name of a company chartered in Illinois to take over the property of the Chicago Terminal Transfer. (See Chicago Terminal Transfer.)

BOSTON & MAINE.—The Massachusetts Railroad Commission has given the company permission to sell at auction $569,900 common stock unsubscribed for.

See also New York, New Haven & Hartford.

BOSTON RAILROAD HOLDING CO.—See New York, New Haven & Hartford.

CHICAGO, MILWAUKEE & PUGET SOUND.—The *Wall Street Journal* says that within a short time the C., M. & P. S. is to take over and operate as part of its own line the Montana Railroad, the $3,500,000 stock and $2,000,000 first mortgage bonds of which are owned by the C., M. & P. S. The road runs from Lombard, Mont., to Lewistown, 157 miles.

CHICAGO, MILWAUKEE & ST. PAUL.—See an item in regard to this company in General News.

CHICAGO, ROCK ISLAND & PACIFIC.—Speyer & Co., New York, have bought $3,500,000 first and refunding mortgage 4 per cent. bonds of 1904-1934. These bonds will be offered for public subscription in London, England, by Speyer Brothers.

The Rock Island Company has applied to the New York Stock Exchange for permission to renew its offer of an exchange of its own stock for that of the Chicago, Rock Island & Pacific Railway. The old offer, dated July, 1902, was to exchange for each $100 share of the C., R. I & P. railway stock; $100 4 per cent. bonds of the C., R. I. & P. Railroad Company of Iowa, and $70 in preferred stock of the Rock Island Company and $100 in the Rock Island Company common stock. There was exchanged $70,199,000 out of a total outstanding of $74,850,000, and transfers made in the last few years have reduced the old Railway stock outstanding to about $4,000,000.

CHICAGO TERMINAL TRANSFER.—The property was sold on January 6 under foreclosure for $16,000,000 to H. R. Preston, general solicitor of the Baltimore & Ohio. The sum bid was $860,000 more than the upset price. The B. & O. bought the property subject to two mortgages aggregating $1,044,000.

The United States circuit court on the day before the sale denied the application of the minority common stockholders to intervene.

See Baltimore & Ohio Chicago Terminal.

DELAWARE RAILROAD.—The board of directors have approved the report of the special committee ordering a meeting of stockholders to pass on the question of leasing the property to the Philadelphia, Baltimore & Washington, and on the question of declaring a 70 per cent. stock dividend and an extra cash dividend of 20 per cent.

GULF, TEXAS & WESTERN.—The Texas Railroad Commission has authorized the issue of $1,157,000 mortgage 5 per cent. bonds of 1909-1939, secured by a mortgage on 50 miles of road now in operation from Jacksboro, Tex., to Megarel.

KANSAS CITY, MEXICO & ORIENT.—See item in regard to this company under Railway Construction.

LAKE SHORE & MICHIGAN SOUTHERN.—The company has asked the New York Public Service Commission for authority to issue an additional $15,000,000 4 per cent. debenture bonds of 1906-1931. Of the total authorized issue of $50,000,000 of these bonds there are now outstanding $35,000,000. The Lake Shore also asks permission to guarantee principal and interest on $11,000,000 Jamestown, Franklin & Clearfield bonds.

MCKEESPORT CONNECTING.—This company has increased its capital stock from $40,000 to $1,000,000. The company operates about 16 miles of track in McKeesport, Pa., and does switching service for the various railways entering McKeesport. It is controlled by subsidiaries of the United States Steel Corporation.

MONTANA RAILROAD.—See Chicago, Milwaukee & Puget Sound.

MT. AIRY & EASTERN.—The property of this company is to be sold at auction on January 15. The road runs from Mt. Airy, N. C., to Kibler, Va., 19 miles.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—The directors have declared a semi-annual dividend of 3 per cent., payable February 1. This places the stock on a 6 per cent. annual basis, comparing with 5 per cent. paid in 1909.

NEW YORK, NEW HAVEN & HARTFORD.—Governor Draper, of Massachusetts, in his inaugural address, recommends that bonds guaranteed by the New York, New Haven & Hartford [meaning, apparently, the bonds of the Boston Railroad Holding Co.] shall be made legal investments for savings banks in Massachusetts. The Boston Railroad Holding Co., controlled by the New Haven, owns a controlling interest in the stock of the Boston & Maine.

QUEBEC & LAKE ST. JOHN.—The plan of reorganization following the inability of the company to pay the coupons due January 1, 1910, on the first mortgage bonds is substantially as follows:

New 4 per cent. consolidated perpetual debenture stock, guaranteed, principal and interest by the Canadian Northern, to be created sufficient in amount: (*a*) To exchange the outstanding prior lien bonds (£500,000) at the rate of £100 new stock for every £100 prior lien bonds; (*b*) to exchange the first mortgage bonds (£442,400) at the rate of £60 new stock for every £100 first mortgage bonds; (*c*) to exchange the income bonds (£640,400) at the rate of £10 new stock for every £100 income bonds; (*d*) to exchange the bonds (£10,000) issued by the Lake St. Joseph Hotel Co. and guaranteed by the Quebec & Lake St. John, at the rate of £100 new stock for every £100 hotel bonds; (*e*) to provide for the present floating debt of the company, and (*f*) to provide for additional rolling stock and equipment now required. Interest on the new stock will be payable Feb. 1 and Aug. 1, the first payment for the period from Feb. 1, 1910, to Aug. 1, 1910, to be made on the latter date.

In addition to the guaranty of the Canadian Northern the new stock will be secured by a trust deed constituting the stock a first mortgage on the whole of the property and undertaking of the Quebec & Lake St. John Co., including the Lake St. Joseph Hotel property.

Power to be reserved to the company, subject to certain qualifications, (*a*) to create charges on any new line of railway hereafter constructed ranking in front of the new stock, provided such charges are guaranteed by the government of the Dominion or by one of the provinces of Canada; (*b*) to create additional new stock (ranking *pari passu* with the new stock to be issued as mentioned above) for certain specified purposes.

This plan will be submitted to holders of the prior lien first mortgage and income bonds in London on January 14.

SEABOARD AIR LINE.—The Georgia Railroad Commission has authorized the company to issue $1,380,000 equipment trust notes to pay for additional rolling stock.

WABASH-PITTSBURGH TERMINAL.—The *Wall Street Journal* says that while no action has been taken by any of the committees on the adoption of a plan of reorganization, the general outlines of a plan are being gradually formed, and it is practically agreed that the existing first and second mortgage bonds will have to be replaced with stock; that a new mortgage, under which bonds may be sold for cash, must be placed next the property, and that the securities after the first mortgage bonds will have to be assessed.

"It has been proposed that the first mortgage bondholders be asked to accept 70 per cent. in preferred and 30 per cent. in common stock of the reorganized company, but an alternative plan involving a small cash payment and correspondingly better participation in the new securities is also receiving some consideration. The new bond issue may consist of $15,000,000 5s, and it is expected that a banking syndicate would underwrite this issue at about 80.

"These terms are entirely tentative in this form and may be materially altered before they are presented to the security holders.

Supply Trade Section.

C. Drucklieb, New York, manufacturer of the injector sand blast device, has moved his office from 132 Reade street to 178 Washington street.

John D. Conway, secretary of the Railway Supply Manufacturers' Association, has changed his address to 313 Sixth avenue, Pittsburgh, Pa.

The World Signal Co. has opened an office at 170 Broadway, New York. This will be the main office of the company, with J. H. Wisner in charge.

The Milwaukee plant of the American Bridge Co., New York, was partially destroyed by fire on January 3. The loss is estimated at $200,000.

Frank P. Smith, for 14 years with Manning, Maxwell & Moore, has resigned to accept a position with the Hobart-Allfree Company, Chicago.

The Northern Engineering Works, Detroit, Mich., has bought additional land adjoining the present site on which it is planned to build extensions to the plant.

The Beach Manufacturing Co., Grand Forks, N. Dak., has been incorporated with a capital of $50,000 to make steel culverts, bridges and road-working machinery.

O. C. Gayley has been elected vice-president of the Pressed Steel Car Co., Pittsburgh, Pa., vice J. W. Friend, deceased. Mr. Gayley will be in charge of the sales department.

Edwin Richardson, superintendent of the malleable department of the Crane Co., Chicago, died January 4. He was 57 years old and had been with the Crane Co. for 39 years.

The Roberts & Abbott Co., Inc., Cleveland, Ohio, consulting, supervising and operating engineers, announces that Walter Loring Webb., C. E., has entered the service of the company and will represent it in Philadelphia and vicinity, with office in the Real Estate Trust building.

J. D. Cox was recently elected president of the Cleveland Twist Drill Co., Cleveland, Ohio, to fill the vacancy made by the resignation of F. F. Prentiss, on account of ill health. Mr. Cox was the founder of this company and has always been the practical man in the business.

The National Lumber & Creosoting Co., Texarkana, Ark., reports that its creosoting plant, which was destroyed by fire on September 19, is now in the process of being rebuilt of fireproof construction, with about 50 per cent. greater capacity than that of the old plant, which will be about 2,000,000 ties per year.

The Pilliod Company, Swanton, Ohio, maker of the Baker-Pilliod valve gear, has closed its Chicago office and will open one in New York about February 1. Meantime, all correspondence should be addressed to Swanton. The company reports a growing business, sales for the last few days having amounted to over 200.

H. H. Waldron, of the Scullin-Gallagher Iron & Steel Co., St. Louis, Mo., who formerly had his headquarters in Chicago, has been transferred to the New York office, located at 1 Wall street, and in charge of F. L. Norton. T. W. Aishton succeeds Mr. Waldron in the Chicago office, which is located at 1714 Fisher building, and is in charge of F. W. Graves.

The Ernst Wiener Co., New York, reports that it has opened the following new offices: Petersburg, Va., 38 Sycamore street; Ocalo, Toronto, Ont., Can.; and Mexico City, Mex. The following are the new addresses of old offices: Los Angeles, Cal., 223 W. H. Hellman building; Philadelphia, Pa., 1103 Land Title building; San Francisco, Cal., 112 Market street.

George F. Brown, who retired from the office of treasurer of the Pullman Company in 1907, died at the Calumet Club, Chicago, January 9, aged 66 years. He served in the quartermaster's department of the Union army during the Civil War, held various railway positions, and entered the service of the Pullman Company in 1871, remaining with it in various capacities until his retirement in 1907.

The Adreon Manufacturing Co., St. Louis, Mo., advises that it has sold about 10,000 of its security rail braces and tie plates, the principal sales being to the Terminal Railroad Association of St. Louis; St. Louis Southwestern; Wabash; Hot Springs Street Railway; Detroit, Toledo & Ironton, and White Pass and Yukon. These rail braces and tie plates are used chiefly on curves and at guard rail and switch points.

J. W. Coyle, recently of the Best American Calorific Company, New York, has entered the service of the Rockwell Furnace Company, New York, as a specialist of oil and gas furnaces for railway work. Mr. Coyle is an experienced railway man, having formerly been master blacksmith on the Lehigh Valley at Wilkesbarre, Pa., and later in charge of the drop hammer and machine department on the Philadelphia & Reading at Reading, Pa.

The Bucyrus Co., South Milwaukee, Wis., reports the following recent sales: Two locomotive pile drivers to the C. & N. W., one 100-ton wrecking crane to the C., M. & St. P., and one rotary snow plow to the Grand Trunk Pacific. The company's shops are at present being worked up to their full capacity, particularly on large steam shovel and dredge orders, for which reason extensive additions to the machine shop have been made.

Rhodes, Curry & Co., Amherst, N. S.; the Dominion Car & Foundry Co., Ltd., Montreal, Que., and the Canada Car Co., Ltd., Montreal, have been sold to a syndicate known as the Canadian Car & Foundry Co. Ltd., with offices in the Eastern Township's Bank Building, Montreal. Officers of the new company are N. Curry, president; W. W. Butler, vice-president; N. S. Reeder, second vice-president; F. S. Skelton, secretary and treasurer, and A. H. Chave, general purchasing agent.

The Watson-Stillman Co., New York, has made several additions to its sales department to meet the increasing business in hydraulic tools and turbine pumps. Edwin Stillman has entered the sales department in connection with the New York State business, while the railway business in the southern states is now in charge of Frank C. Clark. More direct representation has become necessary in the Orient, and F. W. Horn, machinery importer of Yokohama, Japan, will represent the company.

The Commonwealth Trust Co., Pittsburgh, Pa., announces that the manufacturing plant of the General Castings Co. will be offered at receiver's sale on February 2 in the rotunda of the Pittsburgh court house. This property includes 9,435 acres of ground and the buildings include a large steel frame slate roof building, a pattern house, a power house, a tenement house of ten apartments, brick office buildings, etc.; also all the necessary equipment, machinery, furnaces, cranes, etc., used in a plant of this kind.

The board of directors of the Strouse Automatic Stoker Co., Chicago, held its annual meeting at the Palmer House, Chicago, January 4, 1910. This company holds the patents on the automatic stoker invented by W. H. Strouse, Oscalusa, Ia., which was fully described in the *Railway Age Gazette* of February 5, 1909, page 255. The American Automatic Stoker Co., with offices in the Railway Exchange Building, Chicago, and factory at Milwaukee, Wis., is now putting the stoker on the market. Fourteen roads have it in use, the following being included in that number: Chicago & Alton, New York Central lines, Chicago, Milwaukee & St. Paul, Northern Pacific, Great Northern, and Detroit, Toledo & Ironton.

The Crocker-Wheeler Co., Ampere, N. J., advises that recent sales aggregate more than 5,000 h.p. in d.c. motors, and approximately 2,000 k.w. in d.c. generators and 2,000 k.v.a. in a.c. generators. Prominent among these sales is one to the Bethlehem Steel Co., South Bethlehem, Pa., calling for five compound-wound interpole motors, with a total output

of 3,600 h.p. This company has also ordered 19 C W mill motors, with a combined capacity of nearly 800 h.p. Among the orders for a.c. apparatus is one for the plant of the Virginia Bridge & Iron Co. calling for two 200-k.v.a., 200-r.p.m., 60-cycle, three-phase, 2,300-volt synchronous motors. This company has also ordered one 50-h.p. compound wound 230-volt d.c. motor.

William C. Post, vice-president and treasurer of the structural iron firm of Post & McCord, Inc., New York, died on January 5 at Atlantic City, N. J., at the age of 43. Mr. Post was graduated from Stevens' Institute of Technology, class of '86. After graduation he entered the employ of Post & McCord as a draftsman, later becoming chief draftsman, which position he held until the firm was merged with the American Bridge Co., New York, in 1900, when he was appointed contracting manager, having entire charge of the company's business in the vicinity of New York. The present drafting room and shop bill systems used by the American Bridge Company were originated by Mr. Post when in the employ of Post & McCord. In 1904 he resigned from the American Bridge Company to become vice-president and treasurer of the newly organized Post & McCord, Inc., which position he held until the time of his death. Mr. Post was a prominent member of several organizations in the building trades interests, being at one time president of the Building Trades' Credit Association, and at the time of his death a member of the Board of Governors of the Building Trades Employers' Association. He also represented his company in the Iron League Erectors' Association of New York and the National Erectors' Association.

Prof. H. K. Barrows, M. Am. Soc. C. E., and Prof. C. B. Breed, Assoc. M. Am. Soc. C. E., of the Massachusetts Institute of Technology, have recently announced that they have entered the practice of consulting engineering under the firm name of Barrows & Breed, with offices at 6 Beacon street, Boston, Mass. Professor Barrows has been in consulting practice for the past three years, specializing along the lines of hydraulic and sanitary engineering. For several years he has been district engineer for the U. S. Geological Survey for New England and New York, which position he has recently resigned. A rearrangement of districts has been made by which C. C. Covert, Assoc. M. Am. Soc. C. E., will be in charge of the New York work, and Cyrus C. Babb, M. Am. Soc. C. E., will direct the hydrographic work in Maine, and T. W. Norcross, Assoc. M. Am. Soc. C. E., becomes district engineer of the remaining New England states. Prof. Breed's specialties are railway and municipal engineering. He has been connected with several of the large projects for the elimination of grade crossings in Massachusetts and with many cases of litigation involving railways. He is joint author of "The Principles and Practice of Surveying." The new firm will pay special attention to water power and supply, sanitary engineering and railway engineering.

Supplymen's Association at Atlantic City.

John D. Conway, secretary of the Railway Supply Manufacturers' Association, 313 Sixth avenue, Pittsburgh, Pa., has issued a circular announcing the principal features of the arrangements for the Master Car Builders' and Master Mechanics' conventions at Atlantic City, N. J., June 15-22 next. The exhibits and the offices of the association will be located on Young's Pier as before, with the exception of the track exhibits, which will be placed as they were in 1909, on the tracks of the Philadelphia & Reading Railway, about 200 yards from the convention pier. Contract has been let for the erection of exhibit structures. It provides for 69,000 sq. ft. of exhibit space, exclusive of aisles, and 40 cents per sq. ft. will cover the cost of erecting structures and providing the usual facilities. The color scheme will again be green and white. A telephone will be provided between every two exhibitors with free local service from Monday, June 13, to Thursday, June 23. Aquarium Court will have the column construction of previous years. The upper floor of Exhibition Hall will not be used, and the lower floor will have ceiling and walls calcimined white. Eight candle-power electric lamps will be placed 2 ft. apart along each of ten cornice lines and will be lighted throughout the day, so that each aisle will have two rows of these lights and each booth a row at the front and a row at the back. Annex court contains large spaces which may be built largely to suit occupants. The annex will have the column and panel construction substantially as in 1909, but very heavy exhibits cannot be placed on this end of the pier. Exhibits of medium heavy weight can be put in the addition to the hotel men's annex in the side spaces, as these are over concrete piles, but only light exhibits can go in the center spaces.

Power for operating exhibits will be furnished as heretofore. An additional boiler and a larger motor-driven compressor will be installed, and it is expected that with these additions all reasonable demands can be met.

Application for space should reach the secretary by January 31. On February 16, in Pittsburgh, space will be assigned to all exhibitors who have made application prior to that date, and the procedure will be substantially the same as in 1909. The exhibitors, if any, whose requirements, in the judgment of the exhibit committee, make it imperative that they be specially taken care of, will be assigned space first. Lots will then be drawn to determine the order in which exhibitors may choose space. If a representative of the exhibitor is present, he may choose in his turn; if there is no representative present, the application will be used as a guide in assigning the best space possible. The number of advance applications already received indicates a very great demand for space. Mr. Conway gives the prices at which Joseph L. Shoemaker & Co., 926 Arch street, Philadelphia, will rent furniture for the eight days of the conventions, also rates for rugs. A complete list of hotels will be given in a later circular.

Mr. Conway calls attention to the resolution of the executive committee, prohibiting the distribution of souvenirs at the conventions; and also to the rule prohibiting the distribution of advertising matter from booth to booth.

In connection with the conventions the *Railway Age Gazette* will this year print eight daily issues, instead of seven, as heretofore.

TRADE PUBLICATIONS.

Oil Fuel Burner.—The Hauck Manufacturing Co., New York, has just issued a catalogue, series 30, which illustrates and describes the Hauck oil burner for boiler, machine, coppersmith and forge shops and general structural work.

Mining Engineering.—The University of Illinois has issued a circular of information on the department of mining engineering recently established. The new department has the hearty support of the operators' and mine workers' associations.

Gold's Cyclone Ventilator.—The Gold Car Heating & Lighting Co., New York, has issued a leaflet containing a complete description of Gold's cyclone ventilator for passenger equipment cars, which same was fully illustrated and described in the *Railway Age Gazette* of December 10, 1909.

Bucyrus Calendar.—The 1910 calendar which has been distributed by the Bucyrus Co., South Milwaukee, Wis., bears a 16-in. x 20-in. photograph of 15 Bucyrus steam shovels working in the Rio Tinto Mines, Spain. The picture is mounted on a white mat, 24 in. x 36 in., having also a calendar pad.

Winter Resorts.—The Mobile & Ohio has issued a 32-page booklet on the winter resorts surrounding Mobile. The description of Citronelle is especially good, and analyses of the water and records of the weather conditions which are included prove the excellence of the natural conditions existing in the vicinity.

Arc Lamp Operation.—The Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa., has just issued circular No. 1506, which contains a paper entitled "Recent Types of Arc Lamps and Their Operation," which was read by C. E. Stephens before the convention of the National Electric Light Association last June.

Railway and Engineering Association Meetings.—The Storrs Mica Co., Owego, N. Y., is distributing a calendar for January, February and March. Each month has a separate page

on which the dates of the various meetings of the railway and engineering association meetings are noted. Attached to the calendar also is a list of membership of the Railway Business Association.

Coal Screens—Mine Locomotives.—The Jeffrey Manufacturing Co., Columbus, Ohio, has just issued catalogue No. 69B fully illustrating and describing Jeffrey revolving coal, stone and gravel screens, tipple shaking screens, etc. Illustrations of a number of installations of this equipment are also given. Bulletin No. 17 contains a large number of illustrations of Jeffrey electric mine locomotives and installations at mines. The Jeffrey electric industrial locomotives for use in shop and lumber yards are also given.

RAILWAY STRUCTURES.

Anniston, Ala.—The Louisville & Nashville is to improve its passenger station at an estimated cost of $35,000.

Charlemont, Mass.—See Boston & Maine under Railway Construction.

Chattanooga, Tenn.—The Central of Georgia is said to be at work on a new freight house to cost $50,000.

Cherryvale, Kan.—The Atchison, Topeka & Santa Fe has begun work preliminary to building a new roundhouse.

Crawfordsville, Ind.—The Cleveland, Cincinnati, Chicago & St. Louis is preparing plans for a passenger and freight station.

Ellsworth, Kan.—The St. Louis & San Francisco has authorized the building of a passenger station to replace the one destroyed by fire a short time ago. The roundhouse, which was also burned, will probably be replaced soon.

Fort Morgan, Colo.—The Union Pacific will build a station in Fort Morgan. The company has asked for the passage of an ordinance to close up certain streets and alleys.

Gloucester, Mass.—See Boston & Maine under Railway Construction.

Havre-de Grace, Md.—In regard to the new double-track bridge of the Baltimore & Ohio over the Susquehanna river, see item under General News.

Heavener, Okla.—The Kansas City Southern is to build a ten-stall roundhouse and machine shops.

Keene, N. H.—See Boston & Maine under Railway Construction.

Outlook, Sask.—Bids are wanted until January 22 by J. E. Schwitzer, assistant chief engineer of the Canadian Pacific at Winnipeg, Man., for constructing the substructure of a bridge over the Saskatchewan river at Outlook.

Pendleton, Ore.—See Oregon Railroad & Navigation Co. under Railway Construction.

Proctor, Minn.—See Duluth, Missabe & Northern under Iron and Steel.

Salem, Mass.—See Boston & Maine under Railway Construction.

Shelburne Falls, Mass.—See Boston & Maine under Railway Construction.

Somerset, Pa.—The Baltimore & Ohio is said to have plans made for putting up a new passenger station, also a new freight house, in Somerset, for which $75,000 has been appropriated.

Terre Haute, Ind.—The Terre Haute, Indianapolis & Eastern Traction Co. plans to build an interurban terminal station. The cost is estimated at $250,000.

Tomah, Wis.—The Chicago, Milwaukee & St. Paul is building a plant for the manufacture of railway bicycles and hand cars.

Watervliet, N. Y.—An officer of the Delaware & Hudson writes that the company has had the question of establishing a shop plant at Watervliet under consideration for some time, but as yet nothing definite has been decided.

Late News.

The items in this column were received after the classified departments were closed.

John McDowell has been elected first vice-president of the Bartlett & Florence Railway, with office at Bartlett, Tex.

A. C. Ridgway, formerly general manager of the Denver & Rio Grande at Denver, Colo., has been appointed assistant to the second vice-president of the Chicago, Rock Island & Pacific, with office at Chicago.

A contract is said to have been given by the Atchison, Topeka & Santa Fe for double-tracking the line between Ash Fork, Ariz., and Winslow, on 90 miles. Similar work is to be carried out later from Albuquerque, New Mex., west to Gallup on 150 miles.

L. S. Berg has been elected president of the New Orleans, Mobile & Chicago; W. F. Oren has been elected vice-president and general manager; G. W. Crary has been elected secretary and treasurer, and H. C. Snyder has been elected assistant secretary and assistant treasurer.

Ashley Pond, formerly for a number of years general counsel of the Michigan Central, died of pneumonia, January 12. Mr. Pond was born at Wilmington, N. Y., in 1827, and lived in Michigan. He was made a director of the Michigan Central in 1878, and the following year was appointed general counsel of the same road.

The Abilene Central has been incorporated in Texas, with $150,000 capital and office at Abilene. The company plans to build from Abilene southeast to Waco, 150 miles. The incorporators include Judge D. T. Romar, Fort Worth, Texas; J. Guitar, J. M. Rayford, M. Jones, H. O. Wooten, H. James and W. G. Swenon, of Abilene.

A court order has been issued authorizing the receiver of the Union Railway Co., New York, to make a contract with the New York Central for the construction of a bridge over the tracks of the New York & Putnam at West 130th street, New York. The receiver is also directed to lay double tracks on the bridge, to complete connections through 130th street, to connect with the existing lines of the Union Railway Co.

According to press reports the St. Louis, Brownsville & Mexico is planning extensions as follows from Brownsville, Tex., south to Tampico, Mexico, 300 miles: From Sam Fordyce, Tex., northwest through the valley of the Rio Grande to Laredo, 125 miles, and from Kingsville west to San Antonio, 160 miles. This is conditional upon the raising of money to carry out the work. It is said the improvements will cost about $25,000,000.

F. P. Abercrombie, superintendent of the New York division, of the Pennsylvania Railroad, C. T. Dabney, superintendent of the Central division, and W. N. Bannard, superintendent of the Maryland division, were delegated to the general manager's office at Philadelphia to assist in the exhaustive investigations being made in various transportation problems. These men, effective January 15, are to be known as special agents on the staff of the general manager. J. B. Fisher, superintendent of telegraph, succeeds Mr. Abercrombie and J. C. Johnson, chief clerk in the office of superintendent of telegraph, succeeds Mr. Fisher.

The tentative plan for the reorganization of the Wheeling & Lake Erie provides for a nominal capitalization of $130,000,000. This consists of $40,000,000 preferred stock, $50,000,000 common stock, $15,000,000 new 4 per cent. bonds and $25,579,500 old bonds and equipment notes of the Wheeling & Lake Erie. The plan calls for a cash assessment of 25 per cent. on the three classes of Wheeling & Lake Erie stock now outstanding and 25 per cent. assessment on the second mortgage bondholders. Of the $40,000,000 preferred stock, $4,779,716 will go to present holders of the Wheeling & Lake Erie's three classes of stock, irrespective of the Terminal company's holdings; $21,165,200 will go to Terminal company's first mortgage bondholders, who have the privilege of subscribing to an additional $4,837,760 at par; $5,000,000 will go to the Terminal company's second mortgage bondholders, and $1,500,000 will be taken for cash by the underwriting bankers.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Missouri Pacific is in the market for 60 locomotives.

The Georgia & Florida has ordered six 10-wheel locomotives from the Baldwin Locomotive Works.

The Missouri, Kansas & Texas is reported in the market for 91 locomotives. This item is not confirmed.

The Newburgh & South Shore has ordered two 0-6-0 switching locomotives from the Baldwin Locomotive Works.

The Rio Grande & Eagle Pass is reported to have ordered one consolidation locomotive from the Baldwin company, cylinders 20 in. by 26 in., weight 150,000 lbs. This item is not confirmed.

CAR BUILDING.

The Staten Island Rapid Transit has ordered 11 passenger cars from the Wason Mfg. Co.

The Harriman Lines are negotiating with the Pullman Co. for 2,000 refrigerator cars for the Pacific Fruit Express.

The Portland Railway, Light & Power Co., Portland, Ore., is in the market for 40 electric cars for August delivery.

The Missouri, Kansas & Texas is reported to be considering new freight and passenger equipment. This item is unconfirmed.

The New York, Chicago & St. Louis has ordered, it is said, ten passenger and five baggage cars. This item is unconfirmed.

The Isthmian Canal Commission will receive bids until January 25 for a number of metal 12-yd. dump cars. (Circular 553.)

The Wrightsville & Tennille, mentioned in the *Railway Age Gazette* of December 17 as expecting to buy one coach and one combination mail and baggage car, has ordered this equipment from the Barney & Smith Car Co.

The Swift Refrigerator Transportation Co., mentioned in the *Railway Age Gazette* of September 17 as expecting to build 200 refrigerator cars, has taken bids on this equipment and it has not yet been definitely decided whether the company will order these cars from a builder or whether it will build them in its own shops.

The Intercolonial, as reported in the *Railway Age Gazette* of December 17, has ordered six baggage cars from the Rhodes, Curry Co. These cars will have a capacity of 80,000 lbs. and will weigh 41,000 lbs. They will be 36 ft. long, 8 ft. 6 in. wide and 8 ft. high, inside measurements, and 36 ft. 9⅝ in. long, 9 ft. 1⅝ in. wide and 13 ft. 5 in. high, over all. The bodies and underframes will be of wood. The special equipment includes:

Bolsters, body	Simplex, Barber rollers
Bolsters, truck	Simplex
Brakes	Westinghouse
Brake-beams	Simplex
Brake-shoes	Steel back
Couplers	R. E. Janney
Door fastenings	National Safety
Draft gear	Miner tandem
Heating system	Safety Car Heating & Lighting Co.
Journal boxes	McCord
Paint	Pullman green
Roofs	Canvas
Side bearings	Susemihl
Wheels	Steel

The Delaware, Lackawanna & Western, as mentioned in the *Railway Age Gazette* of November 12, has ordered 500 forty-ton steel hopper coal cars and 500 thirty-ton steel underframe box cars from the American Car & Foundry Co. The coal cars will be 34 ft. ½ in. long, 10 ft. wide and 9 ft. 11 in. high, over all; 30 ft. ¼ in. long and 9 ft. 5⅝ in. wide, inside measurements. The box cars will be 40 ft. 1½ in. long, 9 ft. 7 in. wide and 12 ft. 5½ in. high, over all; 36 ft. long and 8 ft. 6 in. wide, inside measurements. The following special equipment applies to both types of cars:

Brakes	Westinghouse
Bolster	Cast steel with Barber roller bearings
Draft gear	Miner, on coal cars; Cardwell on box cars
Wheels	33-in. cast iron

The Delaware, Lackawanna & Western passenger equipment mentioned in the *Railway Age Gazette* of December 17 will have the following specifications and special equipment: The 10 broad vestibule coaches will be 59 ft. 11 in. long over end sills and 9 ft. 8 in. wide over side sills, and will have a seating capacity for 72 passengers. The underframes are to have cast steel double body bolsters, with end platforms cast solid. The center sills will be deep girders riveted to the body bolster, and the metal side sills will be supported from the center sills with cast steel needle beams and cross ties.

Brakes	Westinghouse high-speed
Couplers	Gould
Draft gear	Miner tandem
Heating system	Gold direct
Lighting system	Pintsch gas
Vestibules	Pullman, flush type
Wheels	36-in. Boles, with Midvale steel tires

The 15 suburban coaches will be 60 ft. 7½ in. long over end sills and 9 ft. 8 in. wide over side sills, with a seating capacity for 78 passengers. The special equipment for the suburban coaches is the same as that for the vestibule coaches, except that the lighting equipment will be that of the Commercial Acetylene Co. The 10 express cars will be 60 ft. 9 in. long over end sills, 9 ft. 8 in. wide over side sills, and the special equipment will be the same as for the vestibule coaches.

IRON AND STEEL.

The Atchison, Topeka & Santa Fe has ordered from the American Bridge Co. 346 tons of structural steel for plate girders.

The Duluth, Missabe & Northern has ordered 410 tons of structural steel from the American Bridge Co., for its new car shops at Proctor, Minn.

General Conditions in Steel.—It is understood that the United States Steel Corporation will report this month an unfilled tonnage as of December 31, 1909, of about 6,000,000 tons, the largest reported in several years. On December 31, 1907, the unfilled tonnage of the corporation was 4,642,000 tons, and on December 31, 1908, it was 3,603,000. The increase in tonnage and the gain in net earnings will be the favorable features of the quarterly statement, which it is understood will be issued about January 25.

Phosphate Rock Handling at Grassy Island, Fla.

The Seaboard Air Line recently installed, at Grassy Island, Fla., a plant for handling phosphate rock. This plant handles the rock from cars into storage bins, and thence into the holds of vessels.

The illustration, Fig. 1, shows the heavy grade trestle approach, over which the cars of phosphate rock are drawn to the storage bins by a Hunt double-drum, steam-operated car puller. The car, when brought in the storage bin, is discharged into a track hopper, which empties into a filler feeding a gravity bucket conveyor, by which the rock is conveyed to the top of the bin and discharged into it. The rock is drawn from the bin into the vessel hold by two Hunt swinging and telescopic chutes, as shown on the right-hand side of the illustration, Fig. 2.

Owing to the size and nature of the rock, the use of conveying machinery ordinarily employed for handling coal and other friable materials was not feasible and an especially designed equipment was made for this plant. The flow of rock from the track hopper to the conveyor filler is controlled by duplex cut-off valves and the rock is fed to the conveyor buckets by a special type of conveyor filler. The operating chain for the filler is driven by the conveyor chain, which insures accu-

rate and uniform filling of the buckets and also prevents any waste of material.

The conveyor consists of a double link chain carrying a series of pivoted buckets, so suspended that they maintain a vertical position, regardless of the direction in which the

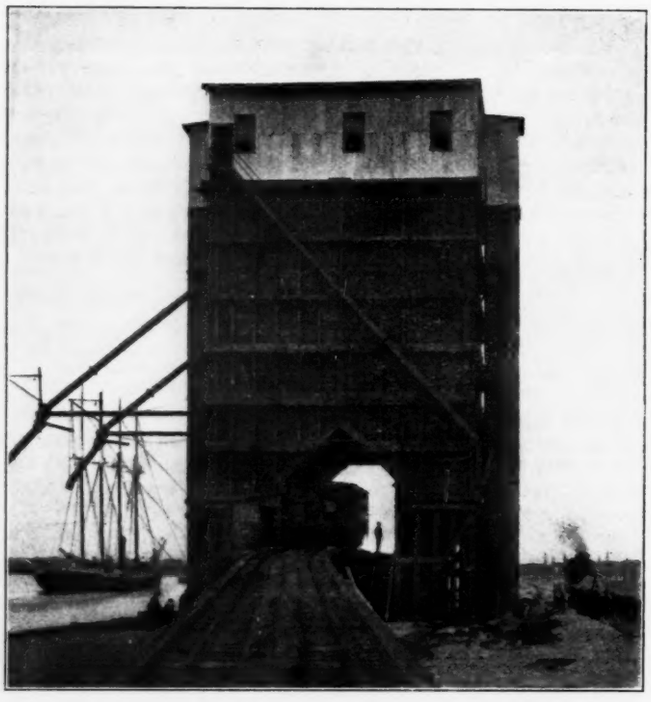


Fig. 1—Grassy Island Phosphate Rock Handling Plant.

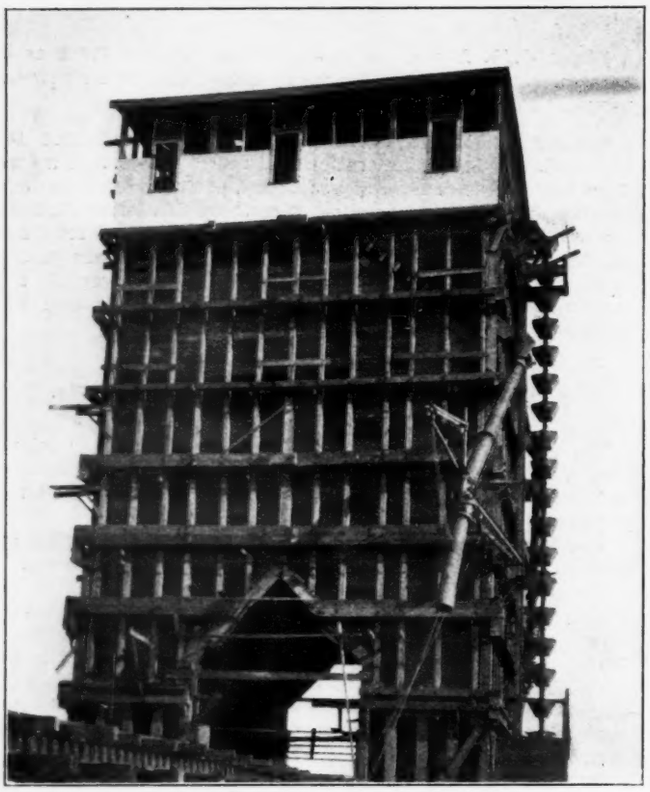


Fig. 2—Near View of Plant Showing Conveyor and Chutes.

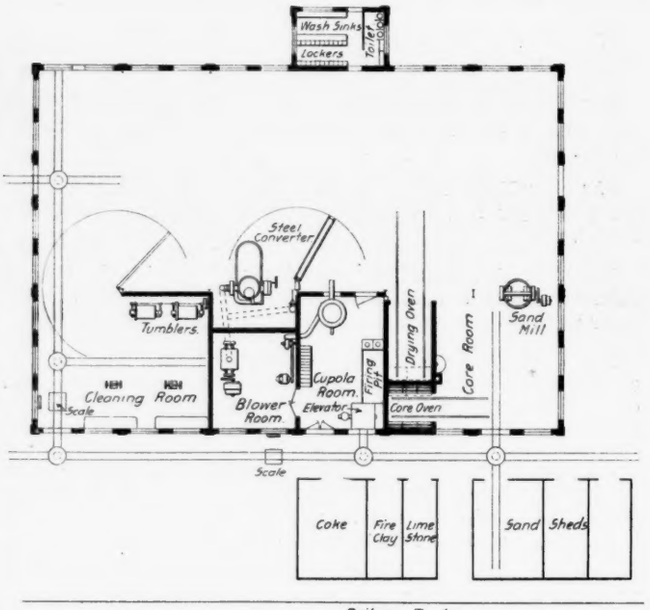
chain is moving. The chain is centrally supported by the driving wheels, which maintain a requisite distance between the links and prevent any alteration or distortion of the track gage. The track for the chain wheels is a standard section rail supported by stands. Changes of direction of the conveyor chain are accomplished by the large radius curves, thus reducing to a minimum the friction and wear at the point of greatest stress. The buckets are dumped automatically over the top of the storage bins. The buckets when emptied immediately right themselves for refilling.

The conveyor is operated by a two-cylinder engine. The driving gear is designed to move the chain by pawls, which successively engage with the studs of the chain, giving an easy and steady motion and reducing chain wear to a minimum. The mechanical equipment in this plant was designed and installed by the C. W. Hunt Co., West New Brighton, N. Y.

New Steel Foundry in Vancouver, B. C.

The demand for steel castings in the western part of Canada has increased rapidly. Machinery used in the lumber and mining industries must be made to withstand very heavy work. Steel castings, which enter largely into the manufacture of this class of machinery, for some time have been shipped from the eastern part of Canada, or imported from the United States, or England, and this has been expensive because of the great distance.

Realizing the growing need in that portion of the Dominion, early in 1909 the directors of the Vancouver Engineering Works, Ltd., Vancouver, B. C., decided to add a steel foundry to their plant. The side blown converter for making steel was adopted, after careful consideration of the most economi-



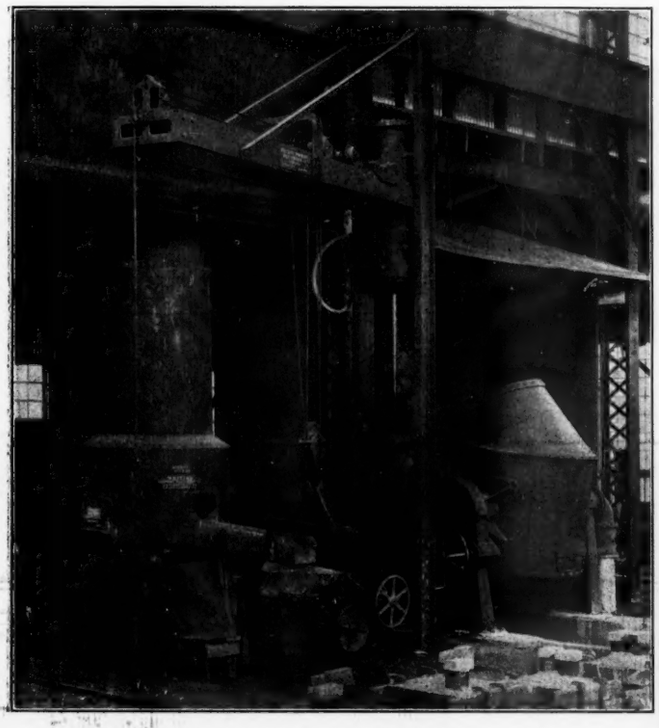
General Plan of Vancouver Foundry.

cal process for producing a light tonnage, and after personal inspection of various plants by F. L. Leighton, general manager of the company. In May, 1909, the Whiting Foundry Equipment Company, Harvey, Ill., was commissioned to design and equip the steel foundry according to the most up-to-date practice. The erection of the plant was begun in June, and the equipment was installed during the following September. The first blow of steel was successfully made October 12, under the supervision of the Whiting Foundry Equipment Company's steel foundry engineer.

The plan is interesting as showing how railways can be supplied with steel castings, by the addition of a small converter to the ordinary foundry outfit, in regions like the west coast, which are a long distance from the larger steel foundries. The plant has at present a capacity of 8 tons per day, and is so designed that extensions for handling double that capacity can be made as required, without interrupting the operation of the present foundry. It is of steel construction throughout, having a main bay 120 ft. long, and 50 ft. wide, with a side bay 120 ft. long and 30 ft. wide. The side bay is designed to provide the most compact grouping of the melting and converting department, the core room, sand

mill, and cleaning department, without interfering with the economical operation of each. In the design every effort was made to secure a continuous system, in order that the raw material might be converted into finished castings without any reverse movements. The steel foundry is so arranged in the plot of the general plant that the movement of all departments is in the direction of the castings store house.

The cupola is the standard Whiting No. 4, the height of which, from floor level to top of the stack, is 35 ft. In order properly to charge the converter, the melting capacity is about seven tons per hour. The cupola charging floor is 22



Cupola and Converter at Vancouver Foundry.

ft. long and 20 ft. wide, and is served by a 2-ton electric elevator, having a lift of 15 ft. An industrial track of 24-in. gage connects the elevator with the stock yard.

Iron is tapped from the cupola into a 6,000-lb. ladle, carried by a pneumatic jib crane of 4 tons capacity. Two taps are made to obtain a full charge for the converter. This is done to avoid holding the molten iron in the hearth of the cupola, where it is exposed to the incandescent coke, from which it will absorb sulphur, especially if the manganese content is low. After the ladle is filled, the jib crane hoists it to the pouring position, and the iron is transferred to the converter, to be blown into steel.

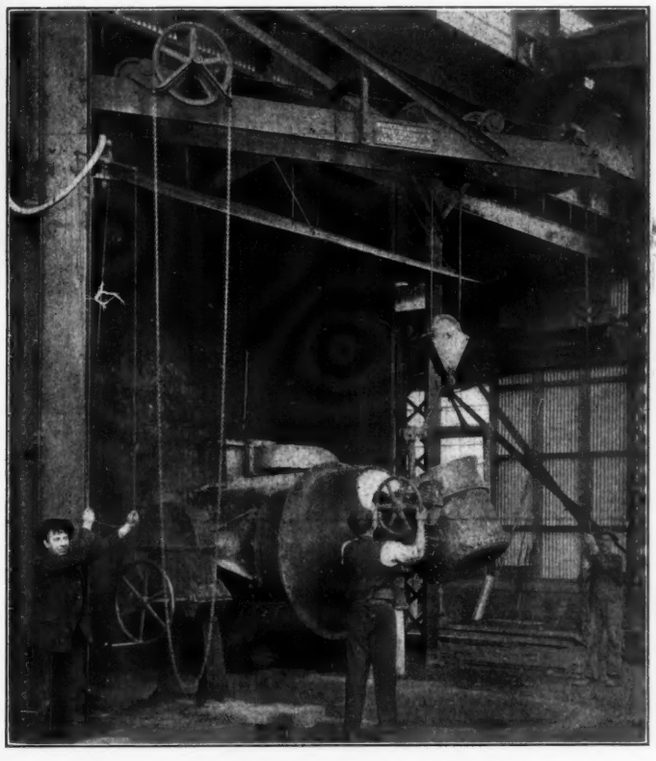
Since no phosphorus or sulphur can be removed, owing to the acid lining of the converter, it is necessary to melt an iron running low in these elements, the maximum limit being 0.04 per cent. each. The manganese content ranges from 0.60 per cent. to 1.50 per cent. The cupola charge is so proportioned as to give about 1 per cent. of manganese, this limit being set because it counteracts the affinity of the iron for the sulphur in the coke, and also minimizes the wear upon the converter lining. As the percentage of silicon in the cupola charge should be from 1.80 per cent. to 2 per cent., in the iron it ranges from 1.20 per cent. to 3.50 per cent. The extensive manufacture of boilers, tanks, etc., gives this company a heavy stock of punchings and clippings to draw upon for the cupola charge.

The 2-ton converter is of the standard Whiting type. It occupies a floor space 20 ft. x 12 ft., and is separated from the remainder of the side bay by a steel curtain wall. It is carried on cast steel trunnions, and spans a concrete pit into which the ladle is lowered to receive the finished steel. A large hood is suspended above the converter to carry the fumes outside the building. The height of the converter is 10 ft. when in blowing position. It is lined with a composition of ganister, sand and fire clay, rammed around a wood form. This lining, if repaired when necessary, will give at least 180 or 200 blows.

Iron from the cupola is poured into the converter, which is then turned to an upright position for blowing. The air pressure ranges from 3 to 5 lbs. a sq. in., being regulated by a valve at the operator's platform. The blowing operation requires from 15 to 20 minutes, varying with the percentage of metalloids in the iron. It is necessary that the time be as brief as possible, as upon the rapidity of the blow depends the temperature of the bath. Reduction in the weight of metal is about 18 per cent. The steel comes from the converter at 1700 deg. C., a temperature insuring sufficient fluidity to yield sharp, sound castings of light section.

Back of the converter, and on a level with the foundry floor, is the blower room, which is equipped with a No. 5 Root positive pressure blower for the converter, and a steel pressure blower for the cupola. The blower is belt-connected to a 75-h.p. Allis-Chalmers Bullock A. C. motor. The steel pressure blower, built by the B. F. Sturtevant Company, Boston, Mass., is a No. 6, belted to a 10-h.p. Allis-Chalmers Bullock A. C. motor. The blast main to the converter is a straight line to insure the minimum loss due to friction. A 14-in. blast pipe connects the cupola with the blower.

The core room, core oven and mold drying oven are in the side bay, adjoining the cupola room, and cover an area 40 ft. long and 30 ft. wide. The mold drying oven, which holds two cars, is 18 ft. long and 10 ft. wide, and is fitted with a Kinnear roller curtain door. The core oven is 10 ft. square, equipped with side shelves for cores, and has a swinging steel plate door.



Filling Converter at Vancouver Foundry.

Adjoining the core room, is the sand mill room, with a 72-in. mill, built by the Vancouver Engineering Works, Ltd. This mill is of the undergeared type, and is belt-driven by a 25-h.p. motor.

The cleaning room adjoins the blower room, and opens into the main bay. The equipment consists of a cold saw of the 2-B type, two power hand saws, built by the Q. M. S. Co., Plainfield, N. J., and two type C Diamond emery grinders. Provision has been made for the future installation of an annealing furnace.

The Vancouver Engineering Works, Ltd., manufacture an extensive line of logging and saw-mill machinery, all types of boilers, burners for saw-mills, and mining machinery.

Pilling Tractor for Swing Bridges.

The Pilling tractor for locomotive turntables was illustrated and fully described in our issue of November 19, 1909. A recent application of this device for the purpose of turning a swing bridge is here illustrated. The bridge carries the Niagara, St. Catharines & Toronto Railway over the Welland canal at Thorold, Ont. It is 320 ft. long, with the center pier on the canal bank. A standard Pilling electric turntable tractor was attached to one end of the bridge, and a quadrant

Near View of Pilling Bridge Tractor.

track was built on a trestle, with a 54-lb. rail for the travel of the tractor in turning the bridge. When operated by hand the bridge is open and closed by four men in 14 minutes, while the electric tractor performs the same operation in 4 minutes. The high winds in this region increase the resistance materially, and there was a tendency for the bridge end to lift and raise the traction wheel from the rail. It was, therefore, more heavily weighted than is usual for turntables, and a clamp was provided to hold the tractor down to the rail. This clamp is lined with wooden shoes and is operated by a screw and wheel somewhat like the old cable car grip.

The Pilling tractor is made by the Weir & Craig Manufacturing Company, 2421 Wallace street, Chicago; also by the Canadian Pilling Co., 180 St. James street, Montreal, Canada.

New "Key Route" Passenger Equipment.

The accompanying halftone shows one of the 16 new coaches being completed in the shops of the San Francisco, Oakland & San Jose Consolidated Railway at Oakland, Cal. They were specially designed for the suburban traffic and are proving very satisfactory. The cars are 70 ft. long over the buffers, and 9 ft. wide outside. The most notable features are their large seating capacity, 88 passengers, and the large double platforms, which enable passengers to board or leave the cars quickly.

The underframes are of steel I-beams and channels sandwiched with Oregon pine sills. The bodies are of the usual

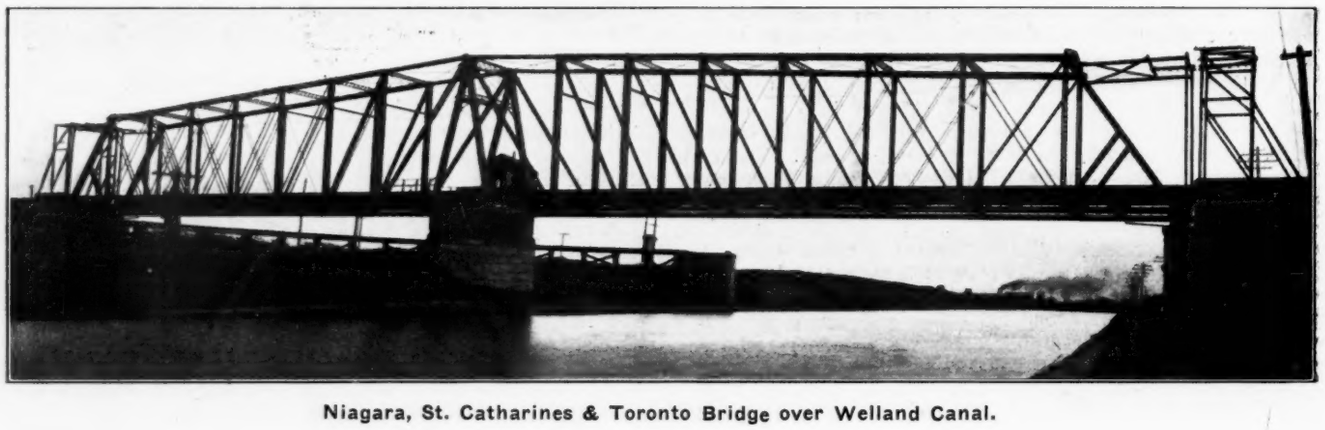
S. F., O. & S. J. Passenger Car.

wood construction. The interior finish is of mahogany throughout, rubbed to dull finish. Electric arc lamps, with opal globes, produce an exceptionally well lighted interior for night service. The bodies are mounted on four-wheel all-steel trucks of the M. C. B. type. The total weight of car complete is 60,000 lbs.

The special equipment includes the following:

Axles	Open-hearth, Gould Coupler Co.
Brakes	Westinghouse high-speed
Buffers, steel	Gould Coupler Co.
Brake-shoes	Diamond "S," Am. Brake-Shoe & Fdry Co.
Ceilings	Indestructible Fibre Co.
Center bearings, ball	Symington
Couplers	Gould Coupler Co.
Curtain fixtures	Curtain Supply Co.
Curtain material	Pantasote
Journal bearings	Gould Coupler Co
Lamps,—arc	Southern Ry. Supply Co.
Paint	Lowe Brothers
Roofs	Canvas
Roof paint	Sherwin-Williams
Springs	Union Spring & Mfg. Co.
Trimmings	Adams & Westlake
Varnish	Chicago Varnish Co.
Ventilators	Globe Ventilator Co.
Wheels	36-in. rolled steel, Midvale Steel Co.

These cars are operated in electric trains comprising three to ten cars. The number of passenger trains daily arriving and departing from the pier terminal at Oakland, Cal., is approximately 580.



Niagara, St. Catharines & Toronto Bridge over Welland Canal.